UNITED STATES PATENT OFFICE.

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MACHINE FOR FEEDING CARDBOARD, &c.

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To all whom it may concern:

Be it known that I, ALBERT A. COHEN, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Machines for Feeding Cardboard, &c., of which the following is a specification.

My invention relates to machines for feeding cardboard, paper, and other material.

The main object of my invention is to fix, govern, or regulate the feed of a material, advanced step by step, so that the places or points at which the material is to be operated upon successively may be brought accurately to the required locality each time. My object is accomplished by cutting, notching, slitting, perforating, indenting, embossing, or otherwise physically altering the material at predetermined points to form shoulders, abutments, or engaging portions, and in subsequently acting upon the same during the feeding operation of the material in such a manner as to bring the portion to be operated upon each time precisely where it is wanted. This is the foundation or underlying principle of my several improvements, which may be carried out in different ways and by an infinite variety of means or machines. The engaging portions of the material may be employed either to positively arrest the material at predetermined times during a feeding movement or as a means whereby the material may be positively carried or moved a required distance. In either case when the material has been fed the necessary distance or to the desired extent it may then be subjected to the required operation or treatment. For instance, the material may be fed along and, by the engagement of a finger or other suitable device with the shoulders or stops formed by the cutting or other process, then positively arrested at the desired time and while thus held subjected to a cutting, printing, or other desired operation, after which it may be moved along farther until the next stop formation in the material is engaged by the finger or other equivalent arresting device; or, instead of thus proceeding, the material may be moved to a finger, the latter then engaged with the cut or shoulder, and the material then moved along by positive engagement with the finger. In this case the finger would act as a carrier and to deliver the material to the desired device or at the required locality. When thus delivered, the material may be subjected to any desired operation or treatment. For example, a portion of it may be cut off, or printed or stamped upon, or the feed thus made may be for the purpose of delivering the material accurately and uniformly to a means which is to take the material to another or farther point for a desired operation or treatment.

I have practiced my invention in the way last alluded to—that is to say, the material having the engaging portions formed therein is first fed to be engaged by fingers which convey the material to a carriage, and this carriage then feeds the material to the devices which are to act upon it.

I have applied my invention to the art of manufacturing playing-cards, to which art brief reference will now be made in order that my invention and its importance and utility may be more fully understood.

All of the cards to constitute the pack are printed upon a single sheet of cardboard and in columns or rows. The faces of the cards are printed first, and then the backs are printed in register with the faces. The sheet is then put through various processes to obtain the required polish or finish, in the course of which the sheet is dampened and dried several times and subjected to the pressure of calendering-rolls. These necessary operations cause the sheets to expand irregularly, so that some of them are a quarter of an inch, more or less, larger than others. The sheets are then cut into strips of six or more cards to the strip, and owing to the expansion the cards in each strip will vary in distance from each other, the variation increasing from the center to the ends of the strip. These strips must be cut up into individual cards, and to produce perfect cards the designs must come centrally upon each severed card; or, in other words, the margin surrounding the design on the back of the card must be uniform or alike on each card of the pack. Owing to the fact that the cards come unequally spaced on the strips it has been extremely difficult heretofore to properly divide the cards. Two methods have heretofore been

pursued in cutting the cards into individuals. One is known as the "hand-feed," which involves the use of a gage, feed-rollers geared together and provided one with a crank, and a punch or knife. The strip is passed between the pair of feed-rollers, and by one or more revolutions of the crank the strip is fed the required distance, the operator endeavoring to bring a given point each time in alinement with the gage. The punch or knife is then brought down and the foremost card cut off. While with exceeding care, involving great eye-strain, cards may by this method be properly cut off, the operation is necessarily slow and expensive, and can be performed accurately only by one having the long experience and training necessary to become capable or expert. Even with such a person errors of cut frequently occur. In order to overcome the objections of the hand-feed, the second method, known as the "automatic feed," was devised, in which the strips are first hand-fed to a gage and thereafter automatically fed step by step, one movement for each card, until all of the cards have been punched out from the strip. This method as heretofore practiced, while speedier and cheaper than the first, still involves the objection of the improper cutting of the cards, for in the machines thus far made for this purpose the strip is fed an equal distance each time, and since the cards are not equally spaced on the strip, as explained, they cannot be cut out so that the design will come centrally of each card or so that the cards will have uniform margins on their sides.

By my improvements the strip may be automatically fed and the cards properly severed therefrom—that is to say, with the design or printed matter on each card centrally of the sides thereof; and by my improvements the sheets may also be divided into strips with uniform top and bottom margins.

I shall confine the following description more particularly to my novel means for severing strips into individual cards.

My improvements consist in certain features of construction and combinations of devices, all as will be hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, representing my several improvements, Figure 1 is a side elevation of a portion of a printing-press in which the sheets are printed and simultaneously cut or slitted at the proper localities. Fig. 2 is a plan view of the "form" removed from the bed of the press. Fig. 3 is a partial side elevation of one of the slitting knives or implements. Fig. 4 is a cross-section of the same, taken at the line *z z* of Fig. 3. Fig. 5 is a plan view of the back of a sheet after having been printed and cut or slitted, the design on the back of one card only being shown in order to avoid confusion and to simplify the work. Fig. 6 is a similar view, enlarged, of one of the strips cut from a sheet such as shown at Fig. 5. Fig. 7 is an enlarged plan of part of a strip with designs on the backs of the cards. Fig. 8 is a plan of the back of a card properly punched or cut out from the strip. Fig. 9 is an end elevation of a machine embodying my invention. Fig. 10 is a front view thereof, the legs being broken off. Fig. 11 is a top plan view thereof with the punch, band-pulley, main shaft, support therefor, and some of the upper gearing removed. Fig. 12 is an enlarged partial perspective to show more particularly the feeding mechanism. Fig. 13 is a perspective view of one of the strip-carrying fingers and the lever or arm by which it is vibrated. Fig. 14 is a side elevation of the carriage which takes each card to the punch. Fig. 15 is a similar view with the movable parts in another position. Fig. 16 is a perspective view of the carriage and appurtenances, omitting the rods for moving the carriage. Fig. 17 is a partial perspective of the rear inner side of the carriage. Fig. 18 is an enlarged vertical section illustrating the feeding operation at one stage. Fig. 19 is a similar view illustrating said operation at another stage. Fig. 20 is a vertical cross-section of one of the side guides. Fig. 21 is a plan view of the same. Fig. 22 is a vertical section of the means by which certain adjustments of the carriage may be effected, said means being part of the mechanism by which the carriage is connected to the crank-shaft. Figs. 23 to 29 are detail views showing various steps in the feeding and cutting operations. Fig. 30 is a perspective view of the stripper.

In the various views the same parts will be found designated by the same letters and numerals of reference.

a, *b*, *c*, and *d* represent, respectively, the bed, inking-rolls, impression-cylinder, and feed-board of a printing-press, and *e* a form mounted upon said bed and comprising a series of independent blocks *f*, preferably electrotypes, disposed in rows, and a series of steel strips *g*, having knives *h*, arranged between adjacent rows and on the outer sides of the first and last rows of the blocks, the whole being properly secured within a chase *i*. Each block contains a design—as *j*, for instance—such as it may be desired to print upon the back of the card. For convenience I have shown only one design, but it will of course be understood that each block may contain a similar design and that the design-patterns may vary in accordance with the desire of the manufacturer. The knives or cutters *h* are formed at equal distances apart on the strip *g*, and in the case shown are spaced from center to center a distance equal to the length of each block. The blocks being of equal dimensions, the knives occupy positions at the corners of the blocks and extend past the top and bottom edges of the blocks, the center of each knife coinciding with either the top or bottom edge or line of its respective block.

k represents a sheet of cardboard after having been acted upon in the press by the form *e*. A plain sheet of cardboard is fed to the grippers of the impression-cylinder, as shown, and is carried around to meet the reciprocating bed containing the form, as in ordinary cylinder-press work, and is simultaneously subjected to the action of the inked electrotypes, whereby the backs of the connected cards are printed, and to the action of the cutting or slitting knives *h*. In the example shown *l* represents the printed design, (only one of which is shown for convenience,) and *m* the cuts or slits made by the knives *h*. From an inspection of Fig. 5 it will be observed that fifty-six cards in this instance are printed at one operation and are arranged in seven transverse rows and eight longitudinal rows or columns. By a guillotine or other suitable cutter the sheet *k* is severed transversely along the dotted lines *n* to form seven strips containing each eight cards. One of said strips is shown enlarged at Fig. 6 and is marked *p*. As the transverse subdivisions on the dotted lines *n* pass centrally through the longitudinal slits or cuts *m* one half of each slit or cut made in the press becomes a part of one strip *p* and the other half a part of its immediately contiguous strip, and on the completion of the subdividing operation each strip *p* is formed at each longitudinal edge with a series of incisions, cuts, or slits, those of one series being directly opposite those of the other and the card back or design being printed centrally between each opposite pair of slits or cuts.

By examining the upper portion of Fig. 7 it will be observed that the cuts *m* are the same distance from arbitrary points, as *q* and *r*, in the design or back in each card, the vertical lines *s* and horizontal arrow-headed lines *t* being used to conveniently exhibit the relationship of the cuts to given portions of the design. At the lower edge portion of the card the other cuts *m* are likewise similarly shown as distant from selected points, as *v* and *w*, in the designs, like lines *s* and *t* being employed to illustrate this effect.

The continuous dotted line *w'* at each card between opposite pairs of cuts shows the line at which the card is to be severed from the strip by the round cornering punch or knife in order to produce a card, such as shown at Fig. 8, with a margin *y* of uniform width extending around the card. As the design is usually printed in color upon a white ground, the border *y* may be, therefore, a white margin of uniform width.

In order to show how the cuts are utilized in the subdivisions of the strips to produce individual cards, such as shown at Fig. 8, reference may now be made to the machine which I have devised for acting upon such strips and delivering each card of each strip successively to the punch or cutter in the exact position for blanking out or disconnecting the same.

1 designates the side or end frames of the machine, and 2 the bed-plate mounted thereon. Bolted to the rear side of the bed-plate is an upright 3, opposite which and also rising from the bed-plate is a curved standard 4.

5 is a driving-shaft, mounted in suitable bearings in the upper ends of the upright 3 and standard 4 and carrying a pulley 6, by which the movable parts of the machine may be driven through the intervention of the usual belt 7. The main shaft 5 is provided with a clutch mechanism 8 9, one part, 8, being carried by the shaft 5 and the other part being pivoted at 10 and connected by a rod 11 to a treadle 12, pivoted at the foot of the machine. The connecting-rod is provided with a weight 13, which tends normally to bring the parts 8 and 9 into engagement to arrest the motion of the shaft 5. When it may be desired to have the shaft 5 revolve, the foot of the operator must keep pressed down the front end of the treadle, which action effects a separation of the parts 8 and 9. This clutch mechanism and its connections are well known and form no part of my present invention. On the shaft 5 is secured a beveled gear 14, which engages another beveled gear 15, mounted at the upper end of an inclined shaft 16, arranged to rotate in boxes or bearings 17 and 18, the former being bolted to the standard 4 and the latter upon an arm or bracket 19, extending upward from the bed-plate. At the lower end of the shaft 16 is secured a small beveled gear 20, which meshes with a beveled gear 21 on a horizontal counter-shaft 22, mounted in brackets 23, rising from the bed-plate.

At the forward end of the counter-shaft 22 is secured a crank 24, to which is attached one end of a rod 25, whose opposite end is threaded at 26, (see Fig. 22,) and by nuts 27, adjustably connected to a head or block 28, mounted about centrally of a cross-rod 29, which at its ends is connected to the right-hand ends of longitudinally-arranged rods 30, (see Figs. 10, 11, and 12,) at their opposite ends provided with sleeves 31, which are slipped each upon a stud 32, projecting outwardly from a lever or pivoted arm 33, connected to the carriage or carrier, (designated as a whole by the numeral 34 and shown more particularly at Fig. 16.) Said carriage consists, essentially, of a cross-bar 35, perforated at its ends, as at 36, to slide upon longitudinal guide-rods 37, fixed at each side of the feed-table. From the cross-bar 35 at each end extends upwardly a pillow or block 38, provided with a bearing 39 for a journal or pin 40, which extends outwardly from an arm 41 sufficiently for the securement thereto by a screw 42 of the lever 33, which at its lower portion is provided with a depending hook 43. The levers 33 are arranged on the outer sides of the pillows or blocks of the carriage and the arms 41 on the inner side thereof, and said levers and arms are adapted to vibrate together under the action of the frame com-

posed of the rods 29 and 30, which frame is reciprocated by the rotation of the crank 24, to which it is connected by the rod 25. Each vibratory arm 41 is provided with an inwardly-extended finger 44, which is notched, grooved, or cut away longitudinally, as at 45, to coöperate with the cuts *m* in the strips, as will be hereinafter more fully explained. On each pillow or block is screwed a stop-arm 46, against which the lever 33 strikes to limit the motion of the feed-finger 44 in one direction, the motion of the finger and the lever being limited in the opposite direction by the hook or curved stop 43 and a pin 47, projecting laterally or outwardly from each pillow or block and traveling in a slot 48 in a bracket 49, screwed or bolted, as at 50, to each side of a feed-table 51. The pin 47, by contact with the ends of the slots 48, also serves to limit the travel of the carriage in both directions. The crank 24 is not connected directly to the carriage, but is connected to the arms which vibrate the fingers, and these arms have a movement independent of the carriage. When the fingers are moving forward, the carriage cannot move backward, and when the fingers are moving backward the carriage cannot move forward, the carriage being confined in its movements by the ends of the slots and the pins 47. The pins 47 prevent the carriage from moving onward by inertia when the crank has arrived at the horizontal position at each half-revolution.

Slightly above the level of the cross-bar 35, and preferably cast therewith at each end, is a ledge 52, upon which is mounted a flat spring 53, which is slightly curved and secured to the ledge by a screw and steady-pin, as indicated. At the front end of each ledge is a flange 54, which coöperates with the notched portion 45 of the finger, as will hereinafter be more fully explained. Normally the forward end of the spring stands above the plane of the flange; but when the finger comes around it depresses the spring and comes to a stop at the flange, which does not act as an abutment, however, the arm 43, previously described, serving to take the strain off the flange.

At the forward or right-hand end of the feed-table is arranged a die 55, with which coöperates a punch or cutter 56, screwed to a plunger, which slides in ways 57 in the standard 4, and is connected at its upper end by adjustable rods 58 to a crank-plate 59 on the main shaft 5. On each side of the punch 56 are provided two ears 60, through perforations in which passes a pin 61, extending upwardly from the stripper 62, and between each pair of ears is arranged a spiral spring 63 for keeping the stripper normally down, a cross-pin 64 being provided to prevent the latter from falling off. The stripper is provided at one side with two upwardly-bent fingers 65, which serve to deflect the leading end of the strip under the punch. A clamp 66, arranged immediately in front of the die, is provided to hold the strip down close to the die during the cutting or punching operation, and this clamp is formed on the end of a bent arm 67, secured to a rock-shaft 68, extending crosswise of the machine and mounted in bearings in standards 69, bolted to the feed-table. A spring 70 encircling the rock-shaft is attached at one end to the hub of the clamping-arm, and at the other end to the bearing of one of the standards. The cross-shaft is prolonged, as at 71, to extend beyond the feed-table, and at its rearmost end is provided with a depending forked arm 72, formed in each fork with a slot 73, with which engages a pin 74, extending laterally from each side of a long square rod 75, the opposite end of which is provided with an antifriction-roller 76 to engage with a cam 77 on the counter-shaft 22. The rod 75 slides in guides or bearings 78, and is provided with a coiled spring 79. The cam operates to draw the rod forward or toward the right, thus compressing the spring 79, and during this movement the clamp 66 is raised, and at this time the strip is fed. When the rise of the cam leaves the roller on the end of the rod, the spring 79 moves the rod back to rock the shaft, which carries the clamp, in the reverse direction and bring the clamp down upon the strip again with a force due to the combined power of the spring on the rod 75 and the spring 70 on the rock-shaft.

On the rock-shaft and extending toward the left is an arm 80, which is adapted to be actuated by a cam or striker 81, mounted on a cross-shaft 82, once to every eight movements of the sliding rod 75, or to every eight revolutions of the crank-shaft 22, and when thus acted upon the arm 80 effects a lifting movement of the clamp and permits the introduction of a fresh strip, which is brought forward at this moment by the auxiliary feed, as will be presently more fully described.

The shaft 82 is provided with a beveled gear 83, which is driven by a beveled gear 84 on one end of an inclined shaft 85, whose opposite end is provided with a worm-gear 86, which meshes with a worm 87 on the shaft 22. The shaft 82 rotates in bearing 88, secured to a yoked bracket 89, which supports the shaft 82 and its attachments. At the front end of the shaft 82 is secured a rotatory sector 90, which at certain times coöperates with a feed-roller 91, supported in hangers 92, secured to the feed-table 51.

The feed board or table 51, preferably made of metal, is mounted above the bed of the press and extends inwardly to the vertical plane of the inner side of the die.

The feed-table, with all of its attachments, is constructed for lateral adjustments for strips of different widths, the widths of the strips varying according to the distance between cards in adjacent rows in the printed sheet. In some sheets the rows, which subsequently form the strips, are printed closer together than others, and hence when these rows are severed to form the strips they are

of varying widths in different sheets, and the center of each design from the top or bottom edge of the card or the sides of the strip would subsequently vary in different designs or editions. Therefore if the machine has been arranged to cut up strips of the minimum width it must be changed or adjusted when strips of greater width are to be cut, in order to have the center of the design register with the center of the punch and die if it be desired to have the top and bottom edges of each card bear uniform margins. Hence the feed-table is constructed for lateral adjustment and in the following manner: In the first place, it is supported by standards 93, extending up from the bed-plate of the press, which standards have at their upper ends threaded eyes 94, through which screws 95 pass inwardly toward each other and into bearings or centers 96, formed at each side of the edge of the feed-table, about midway of the length of the same. These screws when turned to the desired position are set or held by jam-nuts 97. In practice the side edges of the feed-table at the centers 96 are distant from the inner edges of the threaded bearings 94 at the front ends of the standards about one-quarter of an inch, and for this reason the feed-table may be adjusted laterally in either direction between such standards by proper movements of the adjusting-screws. The lateral adjustments required usually do not exceed one-sixteenth of an inch, and in making these adjustments the screws are turned one in and one out, according to the direction in which the table is to be shifted. If the mechanism has been set for feeding the narrowest width of strip, the feed-table must be shifted rearwardly or toward the rod 75. This adjustment of the table for strips of different widths obviates the lateral adjustment independently of the side guides for the strips, to be presently described, and one of which guides is extremely bothersome to adjust; but the capacity of the table for lateral adjustments is provided for another purpose as well—viz., to effect, in the first instance, a proper setting of the table relatively to the center of the die, and so as to have the center of each strip coincident with the center of the die, and subsequently for the accurate resetting of the table relatively to the punch and die when in course of time it may become necessary to sharpen the punch and die. The punch and die have to be sharpened occasionally, and as this operation requires the table to be entirely removed from the bed of the press it has been found advantageous to provide means for the ready and accurate resetting of the table after the sharpening operation. The entire feed-table is also adjustable in a vertical plane to compensate for wear and sharpening of the die. The front end of the feed-table should be on a level with the face of the die. As the die is worn or cut away this end of the feed-table is depressed accordingly by turning the table about the pivots opposite the feed-roller 91. The feed-table is held firmly by means of two screws 98 and 99, Figs. 10, 11, and 12. Through an opening in the strip-lifter 100, secured to the feed-table, and through a transverse slot 101 in the feed-table is passed downwardly the screw 98, whose lower end engages a tapped hole in the bed-plate. By turning the screw down the right-hand portion of the feed-table is depressed, the whole table rocking on the screw-pivots referred to. By turning up the screw 98 the table may of course be oscillated in the opposite direction; but before the table may be tilted downwardly the screw 99 must be lowered. This screw works in a tapped hole in the bed-plate and its upper end simply abuts against the lower side of the feed-table. In connection with the adjusting-screw 98 it serves to firmly lock or hold the table in its adjusted position. By turning the screw 99 down from the under side of the bed-plate the upper end of the screw is carried away from the feed-table, and then the latter may be tilted or adjusted by turning the screw 98.

102 and 103 are guides for the edges of the strips and are mounted upon the feed-table. The guide 102, extending for a large portion of the length of the table, is preferably secured to the table by screws and without provision for independent lateral adjustment. The other guide, 103, at the front side of the table is preferably very much shorter in length and is constructed for lateral adjustments. The adjustable guide 103 consists of a vertically-arranged plate or strip 104, from which extends laterally a threaded pin 105, Fig. 20, which passes through a block 106, secured to the feed-table by a small screw 107. This block is hollow and contains a coiled spring 108, surrounding the plain portion of the threaded pin and bears at one end against the vertical plate 104. The threaded portion of the pin extends out beyond the block and is provided with a nut 109 for drawing the vertical guide-plate outwardly. When the nut is unscrewed, the spring forces the plate inwardly. The plate is provided with flanges 110, that form a fork to embrace the block and serve as a guide for the plate in its movements. To the plate are attached winged guides 111. Guides 112, similar to and opposite 111, are secured to the long fixed guide 102. The spring-pressed vertical plate 104, bearing against the front edge of the cardboard strip, serves to press the rear edge thereof against the fixed guide lightly. If the next strip should be only a trifle wider, the front edge of the strip may force the plate 104 outwardly to accommodate the strip, as the spring 108 is of exceedingly light tension and permits the plate to readily accommodate itself to varying widths of strip, thus providing for the accurate guiding of the various widths by the long fixed guide 102. When the vertical plate is thus moved outwardly, the threaded pin upon the stem and the nut

of course move with the same, and if the next strip should be a narrower one the devices will automatically move together inwardly under the expansion of the spring. The strips are all first fed by hand to a gage 113, which is arranged between the sector 90 and the fingers 44, and this gage consists of a plate 114 and a lateral index or finger 115. The plate is fitted to a rectangular notch at one of the rear corners of the strip lifter or deflector and is provided on its under side with a screw 116, which passes down through a longitudinal slot 117 in the feed-table and is provided on the under side thereof with a clamping-nut 118. The index-supporting plate 114 is prevented from turning by reason of the square notch and is held in place against vertical movement by the screw and nut. The second front slit or cut of each incoming strip is first fed or adjusted to the index or finger 115, as will be hereinafter more fully explained. The slot 117 in the feed-table permits the index to be adjusted lengthwise of the latter, in order that each strip may be placed in such a position that when it is fed by the sector its slit or cut will come in the best possible position relatively to the carriage-fingers 44.

The strip lifter or deflector 100 is screwed upon the feed-table and is beveled or rounded at each end. It serves to insure the feed of the incoming strip above the plane of the tail end of the outgoing strip to avoid any collision in the feed or damage to the strips. This strip-lifter also assists in leading the forward edge of the strip into the winged guides. The manner in which the strip-lifter passes the leading end of the incoming sheet above the tail end of the outgoing sheet during the last punching operation will be described hereinafter.

For the purpose of determining the feed of the carriage 34 or the points at which it shall stop in its movements the rod 25 is made adjustable. If it be desired to have the carriage travel farther forward or nearer to the die, the nuts 27 are loosened and the block 28 on the cross-rod is moved forward nearer to the crank the desired distance, the carriage at the same time being pulled forward, the plain hole in the block sliding along over the threaded portion 26, and if it be desired to have the carriage stop farther back the block is moved in the reverse direction, and in either case after adjustment the nuts are again set up against the block to hold the parts firmly together. When an adjustment of this sort is made, the brackets 49 at the sides of the feed-table should be adjusted correspondingly, and if an adjustable gage 113 be used this may also be adjusted lengthwise of the feed-table in accordance with the adjustment of the carriage-feed.

In order that the carriage may move with the feed-table during its lateral adjustment, the block 28, to which the crank-rod 25 is connected, is provided with a vertical set-screw and nut, by loosening which the cross-rod 29 may be slid through the block to the desired extent or in accordance with the required amount of sidewise adjustment of the feed-table which supports the carriage.

I shall now describe more particularly the mode of operation of the machine and the method of feeding the strips of cardboard and the punching or cutting out of individual cards.

Figs. 9, 10, 11, and 12 of the drawings show the parts in the same positions and in readiness to receive a strip. The operator sits opposite the gage and by hand feeds a strip to the gage, adjusting it thereto preferably by the first nicks or cuts *m* back of the first card, the strip lying between the sector and the roller and with its rear edge against the guide 102. If the machine be now started, by pressing down the treadle 12 the segment will revolve and feed the strip by its pressure against the roller in a forward direction between the winged guides until the second pair of cuts of the strip is firmly grasped by the fingers 44. (In practice I do not use the first pair of cuts in feeding. If, however, the strip were turned around, the first pair of cuts would become the last pair, and these would then be used in the feeding of the last card of the strip.) The fingers firmly grasp when the grooved portions of the fingers are alongside of the flanges 54, the grasping position being indicated at Fig. 29. The lowermost portion or downward lip 45ª of each finger presses down the cut portion of the second card of the strip and causes its forward edge to abut against the flange 54, while the rear edge or corner of the cut portion of the first card is caused to press against the finger or vertical face of the lip 45ª. Thus the strip is prevented from moving in either direction, the finger and the flange alone effecting the locking of the strip. When the strip has become thus locked, the sector 90 simultaneously ceases its feeding operation by passing off the roller, the carriage immediately commences its forward movement, and the clamp is simultaneously lifted. The carriage starts forward by reason of the shanks of the levers 33 coming to a bearing against the arms 46 of the carriage, and by reason of this contact and the pull of the rods 30 by the rotation of the crank 24 the carriage is caused to travel toward the die with the strip firmly grasped or held thereon or thereto.

When the machine is started with the parts in the positions shown at Fig. 12, the fingers are vibrated simultaneously with the initial movement of the sector, and by the time the sector engages the sheet on the roller the fingers have come to a stop and the carriage is thereafter moved forward during the beginning of the feed of the strip by the sector. By the time the leading end of the strip has been fully fed by the sector the carriage has completed its forward stroke and returned with the fingers up ready to engage the first

set of cuts back of the first card. This of course occurs only at the starting of the machine, as thereafter the fingers always engage a set of cuts in their forward travel, and the carriage always moves a card forward. The leading end of the strip having been adjusted to the gage and to the side guides, it is fed by the sector and roller between the winged guides up and over the spring-plates 53, with the first set of cuts back of the first card forward of the fingers. When the fingers come down, the lip portion of each rides upon the uncut or unnicked surface of the card and presses the same down against the spring, as a yielding bed, until the forward edge portion of the cut or until the rear edge of the forward card lies upon the top of the flange 54, and at this moment the lip of the finger presses or keeps down the rear portion of the cut or the forward edge of the next succeeding card, which is thus caused to abut against the face of the flange and prevent any further feed or forward movement of the strip by the fingers, the strip being prevented from slipping backward by the finger or specifically by the vertical face of the lip, as before explained. (See Fig. 19.) When the carriage has completed its forward movement and the fingers start to return, the springs 53 beneath the same operate to throw up the depressed slitted portions of the card above the plane of the flange 54, and thus permit the recession of the carriage. When the carriage with the strip in the bite or grip of the fingers and flanges has made its forward excursion, the clamp is brought down, the fingers are then opened to release the strip, and the carriage then recedes. Just before the carriage finishes its return stroke the punch descends and the first card of the strip is punched out. While the punching takes place the carriage is finishing its return stroke, the clamp is on the strip, and the next set of cuts or nicks in position to be grasped by the fingers on their next forward vibration, the fingers in returning passing beyond the plane of the next set of cuts. When the carriage and the fingers come to the end of their back strokes and about simultaneously with the rise of the punch, the fingers start forward again at once, and at about the moment the fingers engage the said set of cuts the clamp rises to allow the forward motion of the strip under the carrying motion of the fingers until the flanges 54 are reached, and then the carriage recommences its forward movement and the second card is brought under the punch in the manner before explained. During this time the sector is turning around comparatively slowly, since it does not come into action again until about the feed of the last card of the strip by the fingers. Before the feed of the last card commences the operator should have the second strip on the roller, (having adjusted the first set of cuts thereof back of the first card with reference to the gage and the edges of the strip with reference to the side guides.) Immediately the sector coöperates with the roller the second strip is fed forward a comparatively long distance until its leading end has arrived at the position above mentioned with reference to the leading end of the first strip, or, in other words, to the position shown at Fig. 29. When the carriage advances in feeding forward the first card of the second strip, the forward end of the second strip is held above the level of the feed-table by means of the strip-deflector and the flanges of the carriage, so that the forward end of the second strip will pass over the rear end of the first strip, and thus avoid any collision between the two strips. When the stripper on the punch reaches the last card of the first strip just before the punching operation, it acts in a manner to hold said card firmly, and at this moment the cam or striker 81 operates, through the arm 80, to lift the clamp to allow the advance of the forward end of the second strip, which at the close of the sector-feed overlaps the tail end of the first strip at about the same time the punch rises and the skeleton of the first strip falls off from the die. The first card of the second strip is at once fed to the punch, and the cutting-out operation thus continues uninterruptedly. As the cards are punched out they descend into a box or receiver 119 beneath and in front of the bed-plate convenient to the operator. The winged guides keep the incoming strip down to such a level as that in the return movement of the fingers they must pass above the plane of the strip; otherwise the leading end of the incoming strip might bend or move in an upward direction and be caught and turned back by the receding fingers, thus interfering with the operation of the machine.

Referring to Fig. 18, the carriage is shown at the end of its rearward movement and the finger at the limit of its upward movement with the strip fed forward over and upon the spring-plate, and at this time it may be considered that the sector has finished its feeding motion or parted company with the roller 91. As the rods 30 are now drawn forward the fingers vibrate downwardly and soon bear or press upon the surface of the strip. As they move along the same they soon come into register with a set of the cuts *m* and positively engage the same. If the cuts be not exactly in alinement with the flanges, the fingers will carry them positively to the flanges, and hence feed the strip slightly forward during this motion. When the cuts are in alinement with the flanges 54 and the feed-fingers have arrived at their vertical positions, as shown at Fig. 19, the strip becomes locked, as it were, to or upon the carriage.

Referring to Fig. 23, the carriage is shown in its rearward position, the fingers vibrated backwardly and upwardly, the punch ascending, the clamp down upon the last card of a

strip, a succeeding strip set to the feed-gage, and the sector about to coöperate with the feed-roller to feed the second strip forward.

Referring to Fig. 24, the carriage is shown in the same position that it occupies at Fig. 23, the clamp as having been lifted by the cam 77 through the intermediate means described, the finger as having been vibrated downwardly and brought into engagement with the last cuts of the outgoing strip, the punch ascending, and the sector as just commencing to feed the fresh strip forward.

Referring to Fig. 25, the carriage is shown as having been moved forward its full distance with the fingers still engaging the cuts, the clamp still elevated, the punch descending, and the incoming strip as having been partially fed forward.

Referring to Fig. 26, the carriage is shown as still at its forward position, the fingers as disengaged from the outgoing strip, the clamp down upon the rearmost portion of the outgoing strip, the punch descending, and the incoming strip as having been fed farther forward.

Referring to Fig. 27, the carriage is shown as returning to its initial position with the fingers lifted, the clamp as having been raised by means of the striker 81, the stripper as bearing down upon the margins of the last card, the punch as having cut out the last card, (the card being shown in dotted lines,) and the incoming strip as having been still farther advanced by the sector.

Referring to Fig. 28, the carriage is shown at its initial position and the fingers raised, the punch as ascending, the clamp as still elevated by the striker, and the incoming strip as having been nearly fully advanced by the sector.

Referring to Fig. 29, the sector has completed its feed, the carriage is now in its first position, but the fingers have engaged the cuts back of the first card and advanced the same slightly to the flanges of the carriage, as illustrated at Fig. 19, the clamp is still elevated, and the punch is ascending. In short, all of the parts are in condition to permit of the advance of the carriage and the bringing of the first card of the new strip centrally of the punch and die. When the carriage finishes its forward stroke, the clamp is released by the striker, the fingers release the strip, and the first card is held firmly to be cut out by the punch, which now descends, the carriage meanwhile returning to its normal position in readiness to feed the next card forward after the punching action. After the striker releases the clamp (which it is about to do at Fig. 29) it does not coact with the same again until the last card of the strip (shown at Fig. 29) is punched out.

For the purpose of more clearly explaining my improvements and the importance of the cuts and the feeding of the fingers independently of the carriage the following is added, viz: Say, for example, that the cards when printed are exactly three inches apart from center to center and that the carriage is arranged to move each time exactly three inches. Now if the strip bearing the cards should expand (say one-half of an inch) the cards would become unequally spaced or would not be equidistant from center to center or not exactly three inches apart at centers, the expansion occurring from the center of the strip toward the ends. Now if the cards were fed solely by the carriage and three inches every time it is plain that the punch would not divide the cards equally or so cut them as to leave uniform margins. With the cuts *m* in the strips and the fingers 44 a preliminary feed is made (if necessary, on account of expansion) and each cut is placed at a given point on the carriage, and hence each card is placed exactly in the same position on the carriage. Therefore when the carriage feeds and the punch descends each card is blanked out alike—that is, with the same margins. It is immaterial, therefore, how much expansion takes place or whether the distance between the centers of the first and second cards of the strip is three and one-eighth inches, that between the second and third cards three and one-sixteenth inches, and that between the third and fourth cards three and one thirty-second inches, because the distances are adjusted or provided for by the cuts and fingers before the successive cards are delivered to the carriage—that is to say, if the first card does not register with the flanges of the carriage before the carriage takes the card to the punch the fingers move the strip forward by engagement until the cuts do register with the flanges. Then the carriage with the card properly placed moves toward the punch and delivers the card to the die with the center of the card in line with the center of the punch and die. Now the second card to be cut may not come naturally to the same place on the carriage that the first card was delivered at, and if it should not the fingers will by engagement with the third set of cuts (or the cuts which govern the feed of the second card) move the strip slightly forward until the cuts aline with the flanges, and hence the second card will be delivered at the required place on the carriage and at exactly the same point at which the first card was delivered. The preliminary feed for the second card may be less than that for the first card, and the said preliminary feed may vary for all of the cards, but whatever amount of preliminary feed may be needed for any card (and which is always slight) the fingers will readily effect. It will happen at times that the cuts will register naturally with the flanges of the carriage, and in such cases the fingers perform simply their locking or gripping functions. When the fingers bear down on the strip, they sometimes move the same forward by friction and simultaneously press down the stock immediately back of the cuts, so that the rear-

edge portions of the cuts are brought against the flanges or abutments before the fingers engage or arrive at the cuts. When this occurs, the fingers continue to move (after such positive stoppage of the strip by the flanges) until the lowermost portions of the fingers arrive at the cuts, when they coöperate with the front edge portions of the cuts to prevent any backing of the strip. For convenience the cuts or other formations are made midway of the space between the contiguous cards, but they may of course be arranged at other localities, as on the edges of the unsevered cards, since they are left in the skeleton or frame and after assisting in the feed of the cards perform no additional office.

From the foregoing description it will therefore be seen that the cuts, nicks, notches, slits, indentations, embossing, or analogous formations or alterations in the strip serve to define or govern the feed of the cards and render it possible to produce cards with uniform or equal margins. By the physical alterations in the sheet or strip provision is made for a variable feed of the material, so that successive unequally-spaced portions thereof to be operated upon may with great precision be brought to or arrested at a predetermined or given position or locality.

The various operations as I prefer to carry them out involve the following steps; but I do not wish to be limited to all of the steps which I prefer to employ, as some of them may be used without others and are new *per se:* A sheet of cardboard is formed with a series of cuts, incisions, or the like, preferably during the printing of the backs of the cards in the sheet. The sheet is then cut into strips, so as to produce a plurality of sets of cuts or incisions at the longitudinal edges, preferably, of each strip. The series of sets of cuts of each strip are then successively seized or engaged, and by this means the strip is moved forward to a given point. Each of the cuts is then employed to hold the strip in its new position and while it is being moved to another given locality. Then the strip is clamped, the cuts released, the strip subjected to the required operation or treatment and then unclamped or released for another double feed in connection with said cuts.

My improvements may be used to feed any kind of material in sheet or strip form, and hence I do not wish to be limited altogether to the use of paper or cardboard and to the manufacture of playing-cards. The fingers may of course be of other shape or construction than that shown—as, for instance, plain or flat sides without the groove and lip. In fact, in different machines I employ both kinds of fingers. By grooving the fingers as shown the forward cut portions of the cards are prevented from unduly rising by the overhanging ledges or shoulders at right angles to the lips.

Various other changes in detail construction and arrangement of parts of the machine may be made without departing from the spirit of my improvements.

What I claim as new, and desire to secure by Letters Patent, is—

1. As an improvement in the art of manufacturing playing-cards from a sheet or strip of cards having a series of unequally-spaced stop formations, the combination of means for moving the sheet or strip intermittently-varying but previously-unascertainable distances and bringing the stop formations always to a given point, and means coöperating with said stop formations to automatically determine or govern the amount of the successive movements, substantially as set forth.

2. The combination, in a machine for operating upon an unequally-spaced sheet or strip having a series of engaging portions formed therein, mechanism for intermittently variably advancing the same, and means engaging with said engaging portions for successively arresting the feed movements of said sheet or strip, whereby the same is fed unequal distances and the successive portions thereof all brought to the same point or locality, substantially as set forth.

3. In an intermittent feeding mechanism for operating upon a sheet or strip having engaging portions, the combination with the feeding mechanism, and means for coöperating with said engaging portions and thereby independently adjusting the sheet or strip, whereby the latter is moved varying distances and the unequally-spaced portions thereof all brought to the same point or locality, substantially as set forth.

4. The combination of a carriage, and means for engaging cut portions in a strip and delivering successive portions of the strip to a given point on said carriage before said carriage commences its movement, substantially as set forth.

5. The combination of a carriage and fingers thereon for engaging cut portions of a strip and delivering successive parts of said strip to a given point on said carriage before said carriage commences its movement substantially as set forth.

6. The combination of a carriage, and a pair of vibratory fingers mounted thereon and adapted to engage cut portions of a strip containing a plurality of unequally-spaced playing-cards and feed the same successively to a given point on said carriage before it commences its movement, substantially as set forth.

7. The combination of a carriage provided with a flange, and a finger to coöperate with said flange and the cut portions of an unequally-spaced strip of material whereby said strip is adjusted properly upon said carriage before the latter commences its movement, substantially as set forth.

8. The combination of a carriage provided with a pair of flanges, and a pair of fingers to cooperate with the flanges and cut portions of an unequally-spaced strip of material where-

by said strip is properly adjusted on said carriage before the latter commences its movement, substantially as set forth.

9. The combination of a carriage provided with a pair of vertical flanges and a pair of vibratory arms having each a lateral finger, substantially as set forth.

10. The combination of a carriage having a pair of flanges and a pair of springs and a pair of vibratory arms having each a strip-moving finger, substantially as set forth.

11. The combination of a carriage, means for reciprocating the same, a vibratory strip-moving finger mounted on said carriage, and means for moving said finger forming a part of the carriage-moving means and operating in advance of the carriage-moving means to move the strip before and independently of the carriage, substantially as set forth.

12. The combination of a carriage, a pair of vibratory arms provided each with a strip-moving finger mounted on said carriage, a pair of levers connected to said arms, and means attached to said levers for both vibrating said arms and moving said carrier, the said strip-moving fingers being arranged to move before and independently of the carriage and to adjust the strip properly upon the latter, substantially as set forth.

13. The combination of a carriage, a pair of vibratory arms mounted thereon and provided each with a strip-moving finger, a pair of levers attached to said arms, and a reciprocating frame attached to said levers for first vibrating said arms and adjusting the strips properly upon the carriage and then moving said carrier, substantially as set forth.

14. The combination of a carriage, a pair of vibratory arms mounted thereon and provided each with a strip-moving finger operating to adjust the strip upon the carriage before the latter commences to move, a pair of levers connected to said arms, abutments on said carriage, rods attached to said levers, and a crank for reciprocating said rods, substantially as set forth.

15. The combination of a carriage, a pair of vibratory arms mounted thereon and provided each with a strip-moving finger operating to adjust the strip upon the carriage before the latter commences to move, a pair of levers connected to said arms, means for moving said levers, and stops in front and in rear of said levers, substantially as set forth.

16. The combination of a carriage, a pair of vibratory arms mounted thereon and provided each with a strip-moving finger operating to adjust the strip upon the carriage before the latter commences to move, a pair of levers connected to said arms and provided each with a hook, a pin to coöperate with said hook, an abutment in front of each lever, and a reciprocating rod connected to each lever, substantially as set forth.

17. The combination of a carriage provided with a pair of vibratory arms having each a strip-moving finger, a lever connected to each said arm, an abutment in front of said lever, a stationary guide, and an abutment in rear of said lever for limiting its backward movement, and projecting from said carriage to cooperate with said guide and limit the rearward movement of said carriage, and means for moving said levers, substantially as set forth.

18. The combination with a carriage provided with flanges, a pair of vibratory arms having each a finger provided with a lip, levers for moving said arms and fingers, fore-and-aft stops for said fingers, means for vibrating the said levers and moving said carriage, and means for guiding and arresting said carriage, substantially as set forth.

19. The combination of a carriage having a pair of vibratory strip-adjusting fingers, a reciprocatory frame connected to said fingers, a stop therefor and for the strip a crank, and an adjustable crank-rod connected to said frame, substantially as set forth.

20. The combination of a carriage having a pair of vibratory fingers, a reciprocatory frame connected to said fingers and composed of longitudinal rods and a cross-rod, an adjustable head or block on said cross-rod, a crank, and a crank-rod connected to said head or block, substantially as set forth.

21. The combination of a carriage having a pair of vibratory fingers, a reciprocatory frame connected to said fingers and composed of longitudinal rods and a cross-rod, an adjustable head or block on said cross-rod, a crank, and an adjustable crank-rod, substantially as set forth.

22. The combination of a carriage having a pair of vibratory arms, a pair of strip-moving fingers, a pair of levers, a reciprocatory frame connected to said levers, and composed of longitudinal rods and a cross-rod, an adjustable block or head on said cross-rod, a crank, and an adjustable crank-rod, substantially as set forth.

23. The combination of a feed-table provided with longitudinal guide-rods and with slotted side brackets, a carriage composed of a cross-bar, perforated at or near each end, pillows, guide-pins, abutments, flanges, and springs, a pair of vibratory arms having each a grooved finger, a pair of levers connected to said arms and provided each with a hook, a pair of reciprocating rods, united by a cross-rod, a block on said cross-rod, a crank-rod, and a crank, substantially as set forth.

24. The combination with a feed-table provided with longitudinal guide-rods and with slotted side brackets, a carriage composed of a cross-bar perforated at or near each end, pillows, guide-pins, abutments, flanges, and springs, a pair of vibratory arms having each a grooved finger, a pair of levers connected to said arms and provided each with a hook, a pair of reciprocating rods, united by a cross-rod, a block adjustable on said cross-rod, an adjustable crank-rod, and a crank, substantially as set forth.

25. The combination with a punch and die,

of a horizontally-pivoted feed-table, and adjusting and retaining screws 98 and 99 engaging tapped holes in the bed-plate and opposing each other, substantially as set forth.

26. The combination with a punch and die, of a feed-table held by means of screw-pivots, whereby the table may be elevated or lowered at its forward end and also adjusted laterally, substantially as set forth.

27. The combination with a feed-table, of the guide 104, the threaded stem, the spring, and the nut, substantially as set forth.

28. The combination with a feed-table, a recessed block secured thereto, the guide 104 having flanges 110, the screw-stem, the spring, and the nut, substantially as set forth.

29. The combination with a feed-table, a recessed block secured thereto, the guide 104 having flanges 110, wings 111, the screw-stem, the spring, and the nut, substantially as set forth.

30. The combination of a feed-table provided with a feed-roller, a feed-sector, a punch and die, means for raising and lowering the punch, means for moving the carriage back and forth, and means for rotating said sector connected to the means for moving the carriage and geared in a manner to produce a comparatively slow movement of said sector, whereby the carriage may be moved back and forth a number of times to one complete revolution of the sector, substantially as set forth.

31. The combination of a feed-table provided with a feed-roller, a feed-sector mounted on a cross-shaft, a carriage, a crank connected to said carriage for moving the same back and forth, a crank-shaft, and a counter-shaft geared to the sector-shaft and to the crank-shaft so as to be driven by the latter and in a manner to drive the sector-shaft at a less rate of speed than the crank-shaft, substantially as set forth.

32. The combination of a punch and die, a reciprocatory carriage, a feed-table, a rock-shaft, a clamping-arm thereon, a spring connected at one end to a fixed piece and at its opposite end to said clamping-arm, a depending forked and slotted arm connected to said rock-shaft, a rod provided with lateral pins arranged in the slots of said forked arm, a cam for moving said rod in one direction, and a means for moving it in the other direction, substantially as set forth.

33. The combination of a punch and die, a reciprocatory carriage, a feed-table provided with a feed-roller, a feed-sector mounted on a cross-shaft, a clamping-arm mounted on a rock-shaft, the arm 80 mounted on said rock-shaft, and the cam or striker on the sector-shaft, substantially as set forth.

34. The combination with a punch and die, of a reciprocatory carriage, a feed-table provided with a feed-roller, a feed-sector, a rock-shaft, a clamping-arm thereon, means for holding said clamping-arm raised during each forward movement of the carriage, means for holding said clamp down during each return movement of the carriage, and the arm 80 and cam or striker 81 for holding up the clamp during the insertion of a fresh strip, substantially as set forth.

35. The combination with a punch and die, of a reciprocatory carriage, a feed-table, and a fixed plate 100 thereon adapted to lift the forward end of an oncoming strip and cause it to overlie the rear end of the strip being operated upon by the punch and die, substantially as set forth.

36. The combination with a longitudinally-slotted feed-table, of a gage-plate 114 having a gage-finger 115, the screw 116, and nut 118, substantially as set forth.

37. The combination with a die, of a punch provided with guiding-ears, a stripper provided with upwardly-extending fingers and guiding-pins, and a spiral spring surrounding each of said pins and arranged between said guiding-ears, substantially as set forth.

38. The combination of a punch and die, a feed-table, a reciprocatory carriage, the independently-movable fingers thereon for engaging cuts in a strip of cards and bringing each card successively to its proper position on said carriage, means for then moving the said carriage while the fingers are held in engagement with said cuts toward the punch and die and delivering the foremost card of the strip in proper position relatively to said punch and die, a clamp for then holding said strip, means for then disengaging said fingers from said strip and moving them rearwardly to coöperate with the next cuts of the strip, means for bringing down the punch and cutting out the foremost card while the strip is held by the clamp, means for returning the carriage while the last operation is taking place, and means for raising the clamp at the completion of the cutting-out operation, substantially as set forth.

39. The combination, in a machine for operating upon a sheet or strip containing a plurality of cards and having a series of cuts, means for delivering the cards of the strip successively to a reciprocating carrier and cooperating with said cuts to deliver the cards of the strip at exactly the proper place on the carrier, means for holding each said card accurately in position during the movement of the carrier, and a cutting mechanism for removing one card at a time from the strip, substantially as set forth.

40. The combination, in a machine for operating upon a sheet or strip having unequally-spaced slits or cuts, of a main carriage-feed, and an independent finger-feed, the combined throw or movement of the carriage-feed and the finger-feed being greater than the distance apart of said slits or cuts, substantially as set forth.

41. The combination, in a machine for operating upon a sheet or strip having cuts or slits formed therein, of a stop, and a feed-finger adapted to engage with each slit or cut in the sheet or strip and move it to the said

stop and cause one edge of the slit or cut to abut against said stop, substantially as set forth.

42. In a machine for operating upon a sheet or strip having unequally-spaced engaging portions, the combination of a stop or stops and means for intermittently feeding the said engaging portions against said stop or stops; substantially as set forth.

43. In a machine for operating upon a sheet or strip having unequally-spaced engaging portions, means for engaging said engaging portions and variably mechanically moving or adjusting said sheet or strip so as to bring the successive portions thereof all to a given point or locality, and means for intermittently feeding the sheet or strip; substantially as set forth.

44. In a machine for operating upon a sheet or strip of material having unequally-spaced engaging portions, means for feeding the same and means for coöperating with said engaging portions and thereby independently and variably adjusting the sheet or strip, whereby the latter is moved varying distances and the unequally-spaced portions thereof all brought to the same point or locality; substantially as set forth.

45. In a machine for operating upon a sheet or strip having unequally-spaced engaging portions formed therein, a feeding mechanism adapted to intermittently engage with each engaging portion and positively advance the sheet or strip, the said feed mechanism being constructed and arranged to engage with said engaging portions at different points in the path of travel of the feed mechanism, and thereby compensate for the varying distances of the engaging portions, and hence automatically feed the sheet or strip variable distances and bring each engaging portion at each advance always to the same point or locality; substantially as set forth.

46. The combination in a machine for operating upon a sheet or strip having unequally-spaced cuts or slits formed therein, of a feeding mechanism for advancing the sheet or strip, and a stop; said feeding mechanism being constructed and arranged to advance the sheet or strip to the said stop and cause one edge of the cut or slit to abut against said stop; substantially as set forth.

47. In a machine for operating upon a sheet or strip having unequally-spaced cuts or slits formed therein, the combination of a feeding device adapted to bend the stock on one side of the slit or cut out of the plane of the sheet or strip, and to engage the remaining edge portion of the slit or cut, and thereby move or adjust the sheet or strip; substantially as set forth.

48. In a machine for operating upon a sheet or strip having unequally-spaced cuts or slits formed therein, the combination of a yielding bed or support, a feeding device adapted to bend the stock on one side of the slit or cut out of the plane of the sheet or strip and to engage the remaining edge of the slit or cut and move or adjust the sheet or strip, and a stop to serve as an abutment to the bent edge of the slit or cut and thus arrest the movement of the sheet or strip; substantially as set forth.

Signed at city of New York, in the county of New York and State of New York, this 31st day of July, A. D. 1893.

ALBERT A. COHEN.

Witnesses:

JACOB HARTMANN, Jr.,

J. R. HEATH.