

Nov. 13, 1973

J. H. DRILLICK

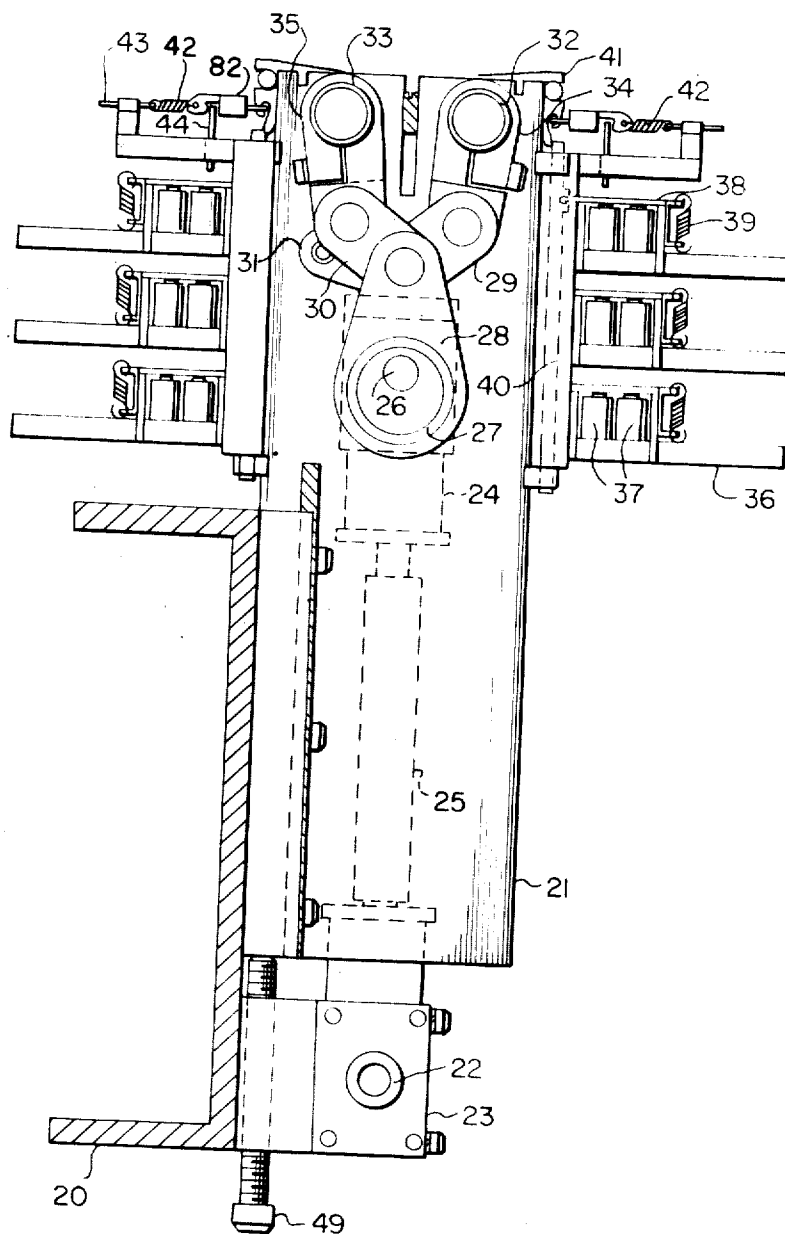
Re. 27,809

HIGH SPEED AUTOMATIC CARD EMBOSSER

Original Filed July 24, 1970

11 Sheets-Sheet 1

FIG. 1.



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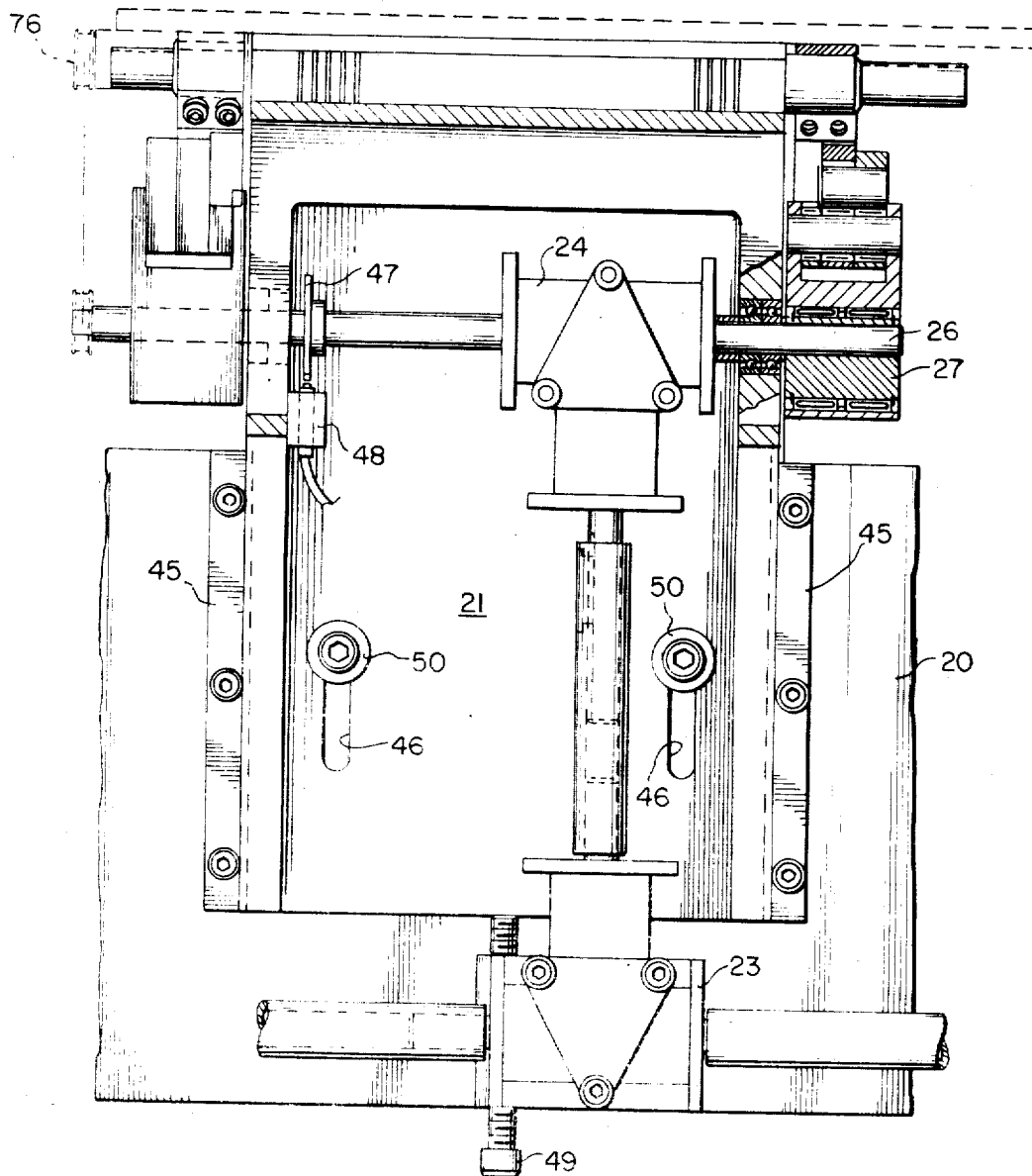
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FIG. 2.



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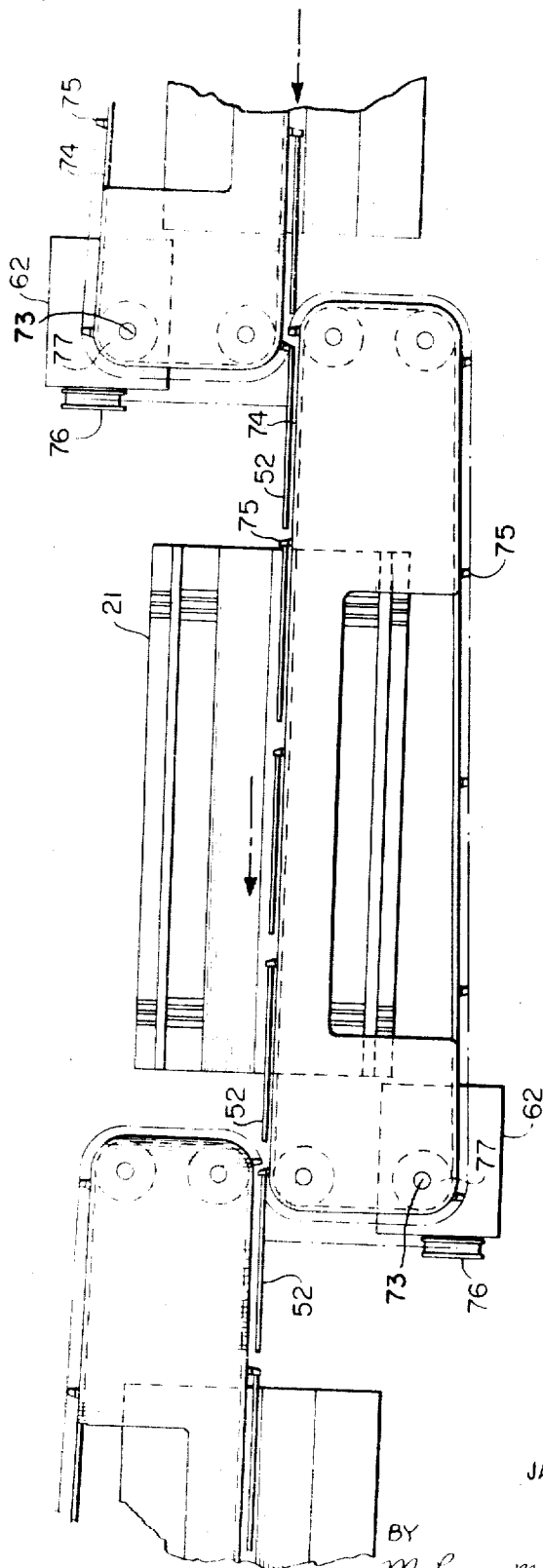
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HIGH SPEED AUTOMATIC CARD EMBOSSER

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FIG. 3.



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FIG. 4.

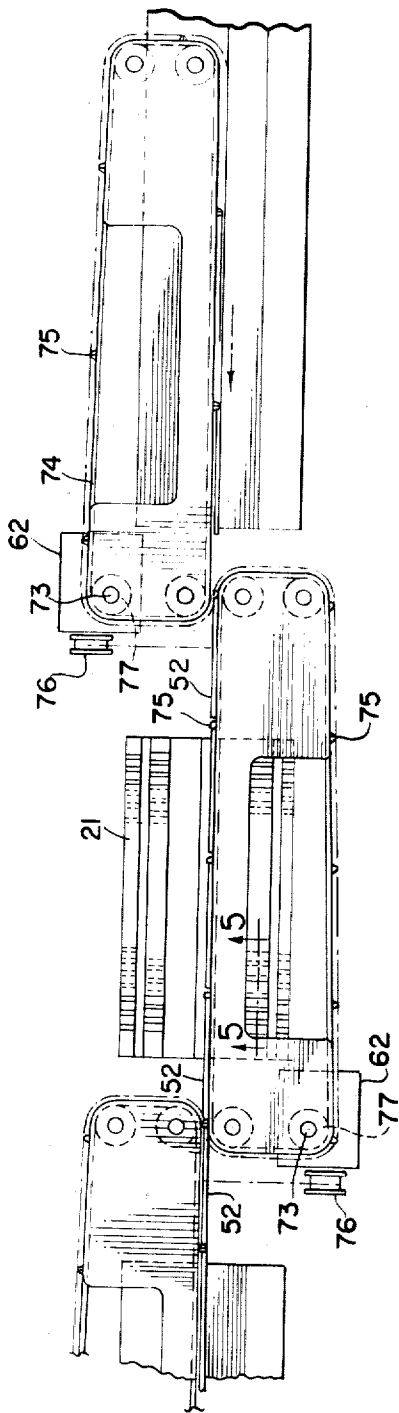


FIG. 6.

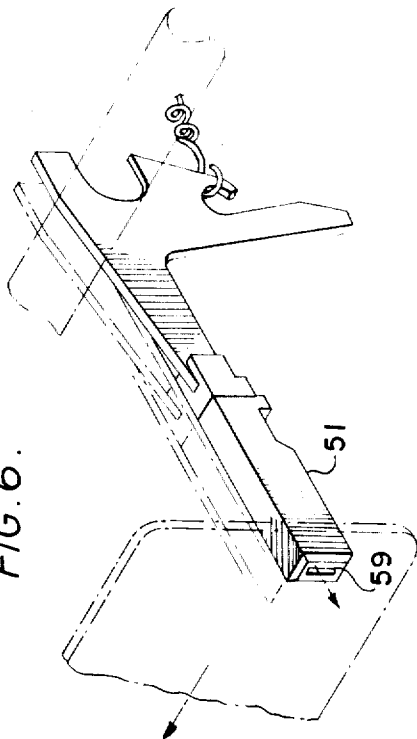
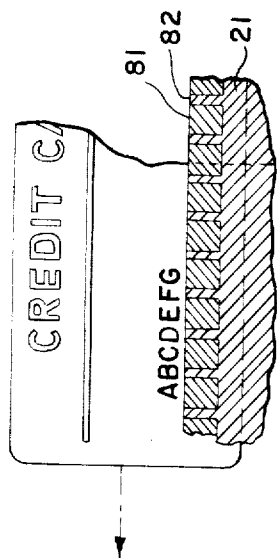


FIG. 5.



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HIGH SPEED AUTOMATIC CARD EMBOSSER

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FIG. 7.

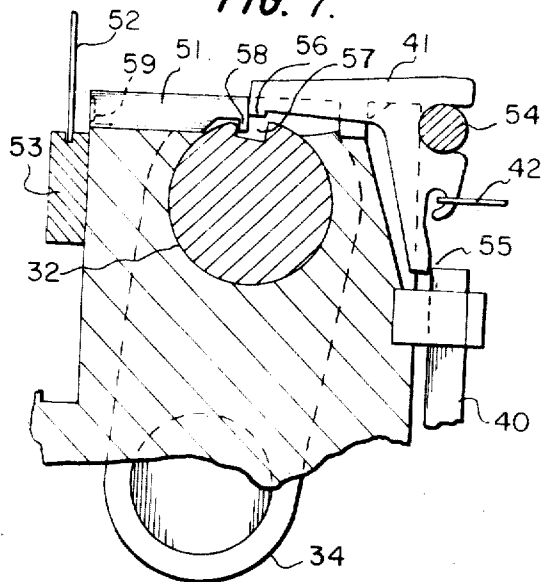


FIG. 8.

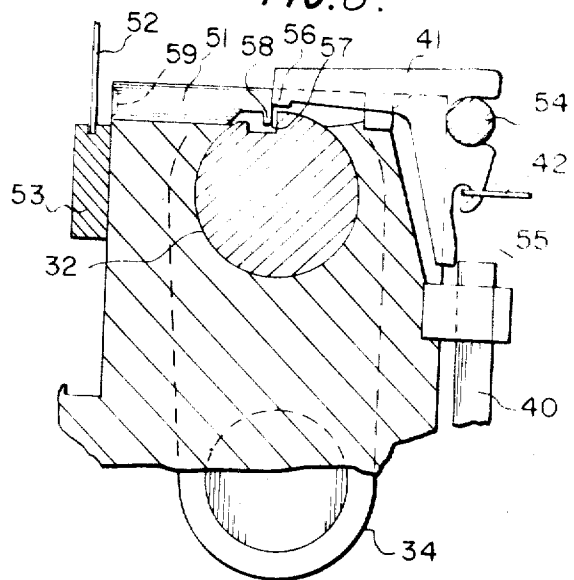


FIG. 9.

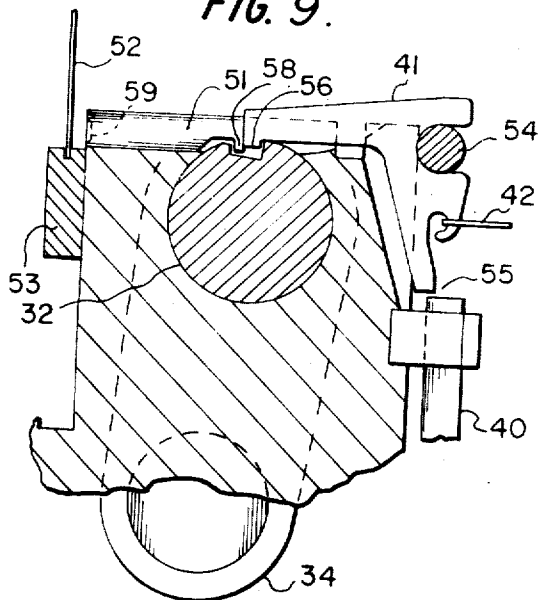
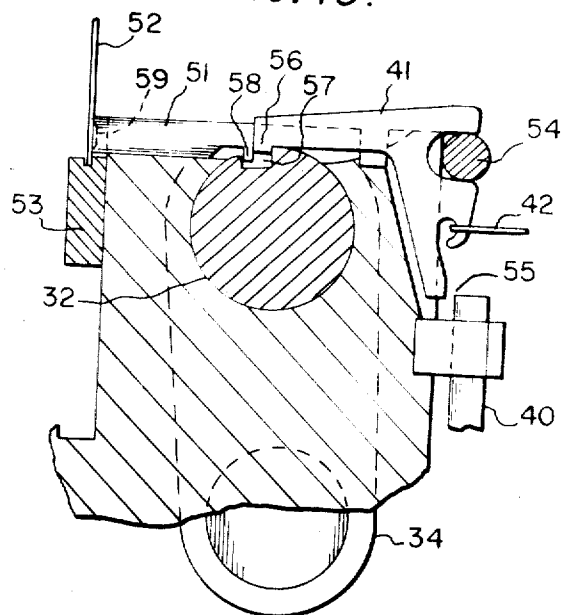


FIG. 10.



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HIGH SPEED AUTOMATIC CARD EMBOSSER

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FIG. 11.

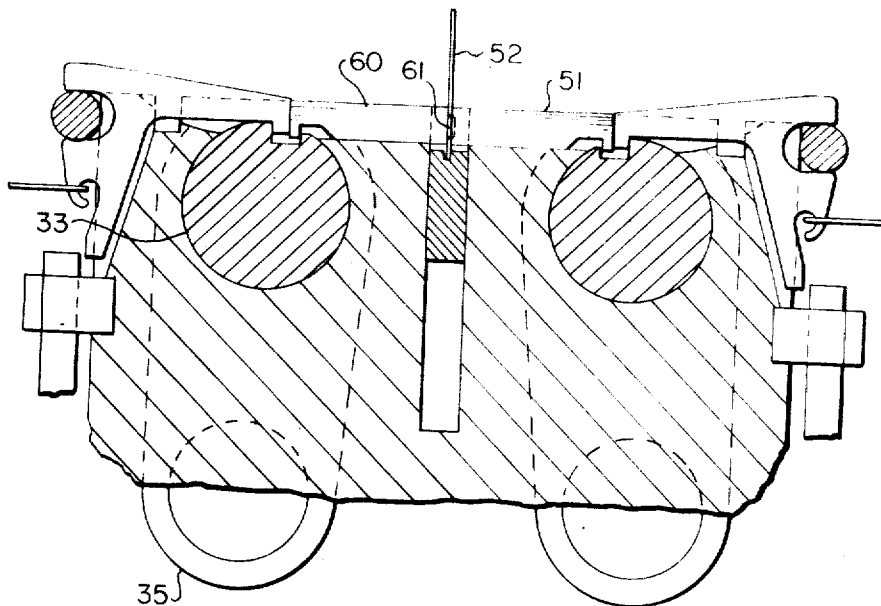


FIG. 12.

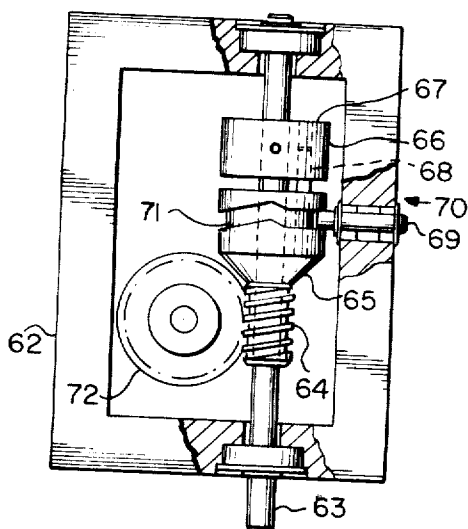
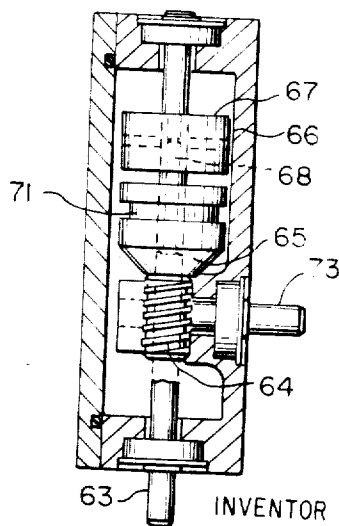


FIG. 13.



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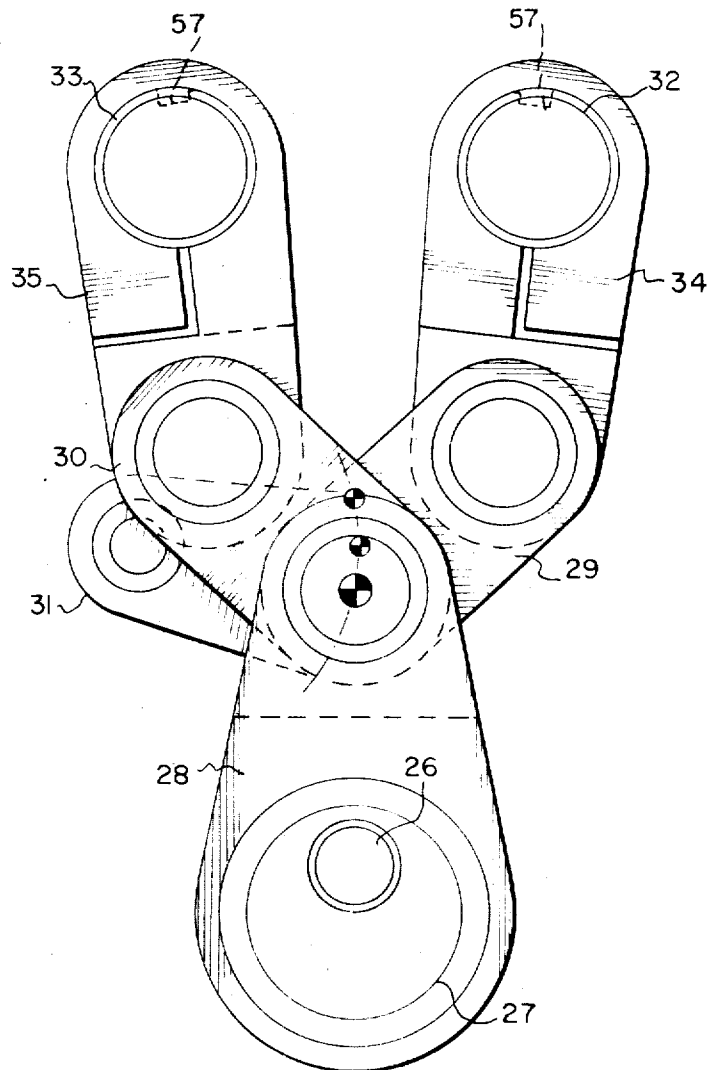
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FIG. 14.



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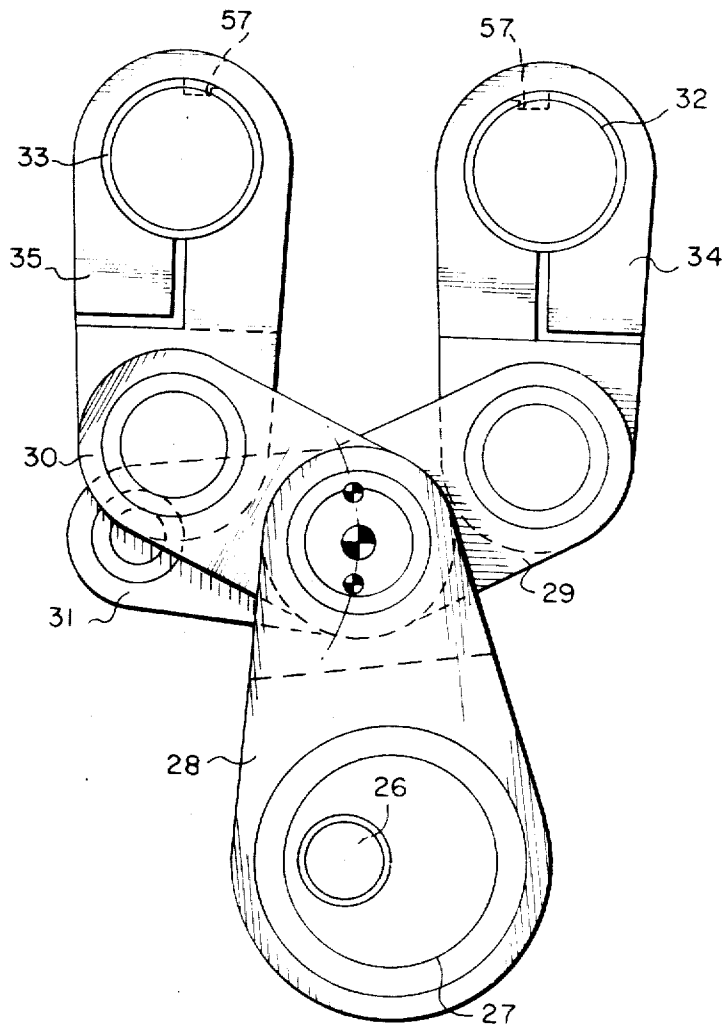
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HIGH SPEED AUTOMATIC CARD EMBOSSE

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FIG. 15.



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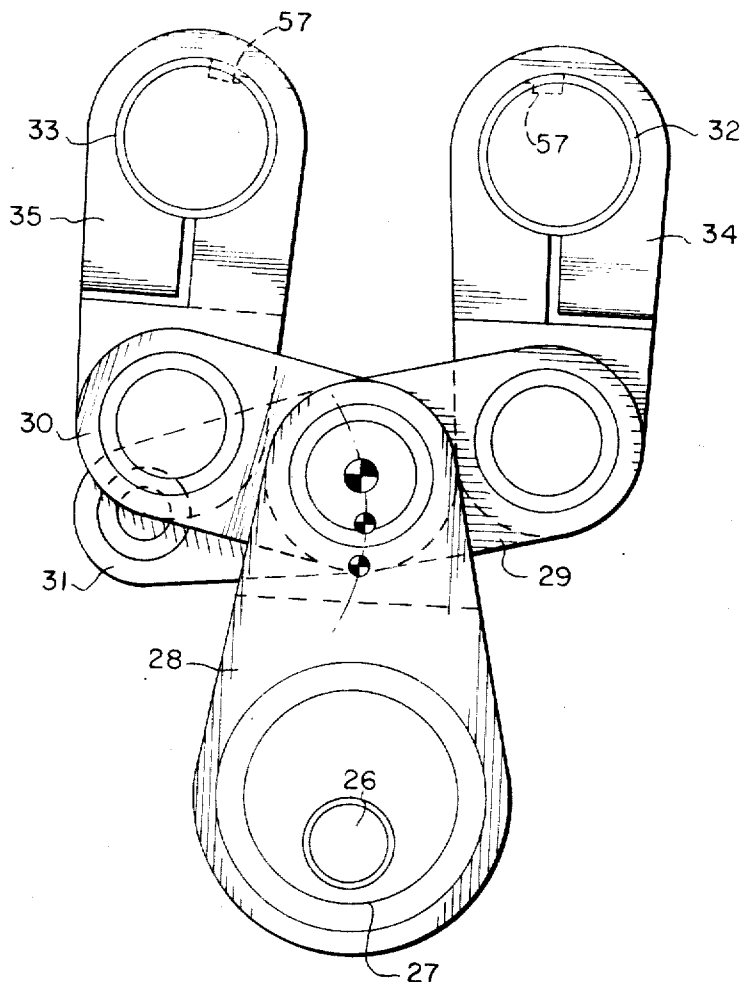
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HIGH SPEED AUTOMATIC CARD EMBOSSER

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FIG. 16.



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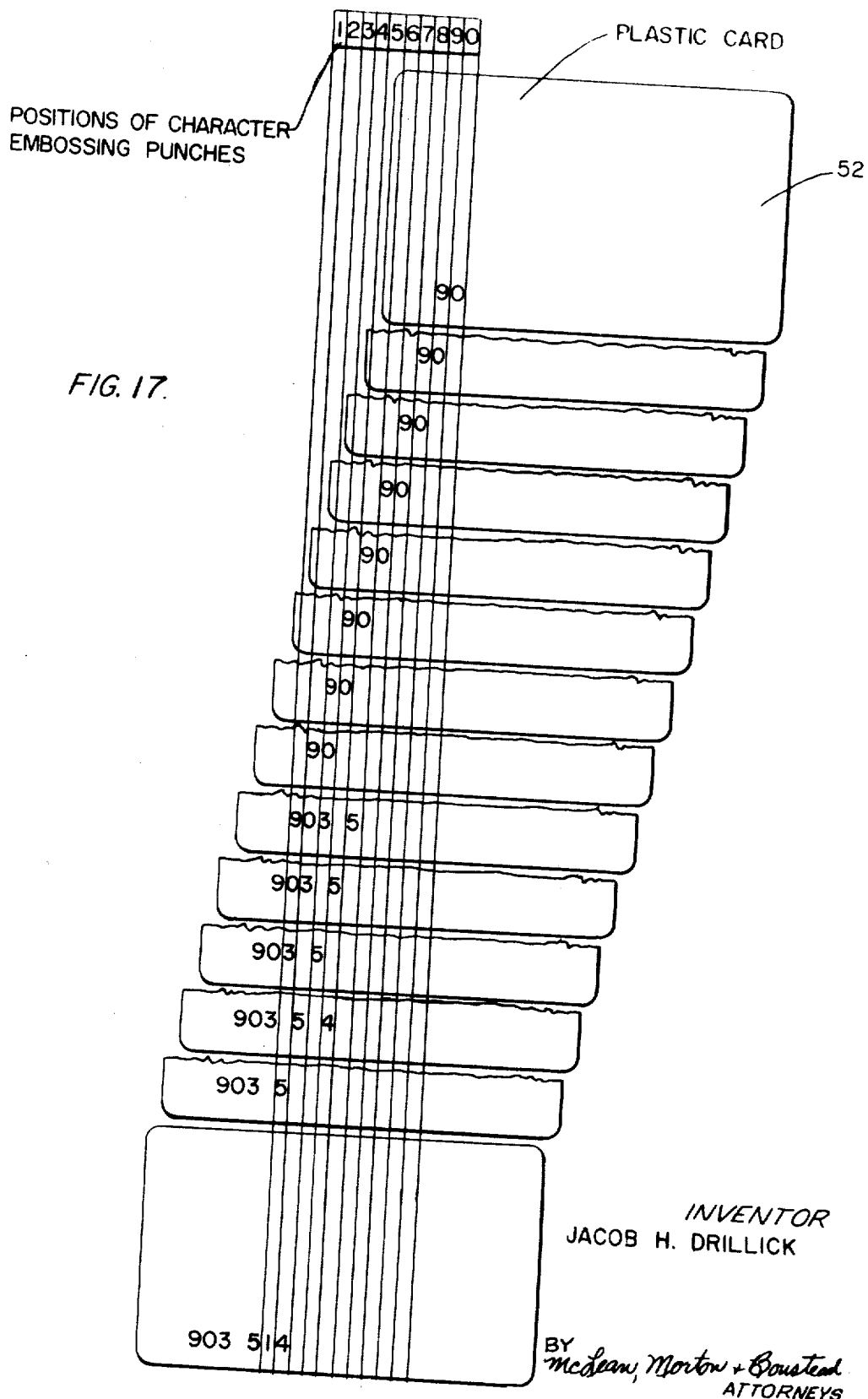
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HIGH SPEED AUTOMATIC CARD EMBOSSE

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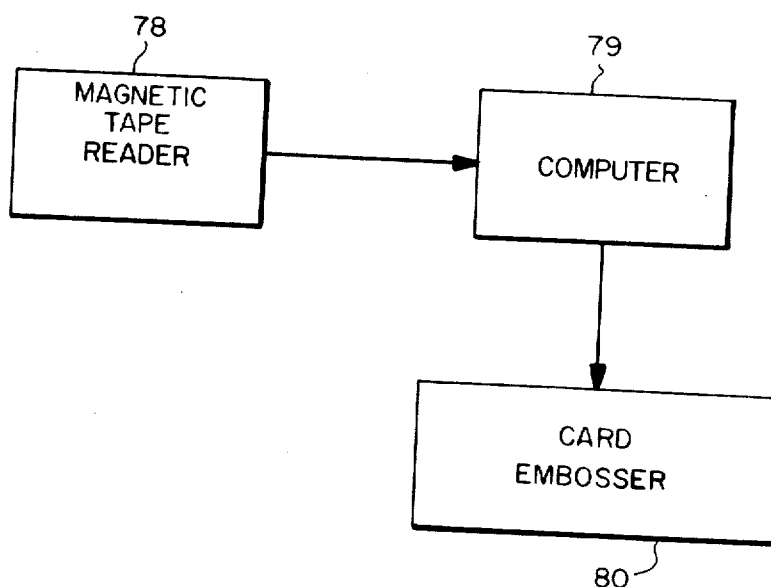


FIG. 18.

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## HIGH SPEED AUTOMATIC CARD EMBOSSE

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Data Card Corporation, St. Paul, Minn.

Original No. 3,638,563, dated Feb. 1, 1972, Ser. No. 57,960, July 24, 1970, which is a continuation-in-part of Ser. No. 769,245, Oct. 21, 1968, and Ser. No. 861,432, Sept. 26, 1969. Application for reissue Aug. 7, 1972, Ser. No. 278,501

Int. Cl. B41j 7/40

U.S. Cl. 101—18

11 Claims

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

### ABSTRACT OF THE DISCLOSURE

A machine for embossing credit cards having data reading means, a computer controlling selectively operable embossing punches corresponding to each character, and indexing means for moving the card past each embossing punch.

### CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part and claims the priority of my two earlier filed U.S. Pat. applications, Ser. No. 769,245, filed Oct. 21, 1968, and Ser. No. 861,432, filed Sept. 26, 1969, both entitled "High Speed Automatic Card Embosser."

### BACKGROUND OF THE INVENTION

This invention relates [the] to apparatus for automatically embossing [type] characters onto plastic cards. The data *identifying the characters* to be embossed on plastic card is usually contained in a magnetic tape or other data handling media such as paper tape or punched cards. This apparatus would extract the data from the magnetic tape and control a high speed card embosser and emboss the characters onto plastic cards such as credit cards or identity cards and the like.

Heretofore, high speed embossing machines have involved the positioning of a plurality of male and female embossing wheels simultaneously to their selected characters after which all wheels are moved to close upon the plastic card. One can readily see the complexity and high cost of such equipment. The wheels have to be positioned and then aligned with extreme accuracy.

A primary object of this invention is to eliminate the need for locating and positioning embossing wheels. Instead of wheels, this device makes use of a plurality of male character embossing punches which move short strokes against corresponding female embossing character dies. Selection is accomplished electronically by the use of a computer to control the actuation of the selected character embossing punches, to emboss the characters onto the preselected positions of the plastic cards as the card moves past the array of punches and dies.

Another object of the invention is to provide a multiple line automatic embossing machine. Other features and advantages of the invention will become clear upon examination of the following description and drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an end view of the card embosser in partial section

FIG. 2 is a front view of the card embosser in partial section;

FIG. 3 is a top view of the card indexing mechanisms of adjacent modules;

FIG. 4 is a top view similar to FIG. 3 showing adjacent

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modules adapted to print lines of differing character size and spacing;

FIG. 5 is a view on lines 5—5 of FIG. 4 showing alignment of adjacent punches exactly twice the distance apart of characters being embossed (shown on line high);

FIG. 6 is a perspective of a single punch and its associated interposer;

FIG. 7 is a partial section showing the die bail withdrawn, the interposer disengaged, and the die withdrawn;

FIG. 8 is a partial section of the same die bail operated, the interposer engaged, and the die withdrawn;

FIG. 9 is a partial section of the same die bail withdrawn, the interposer engaged, and the die withdrawn;

FIG. 10 is a partial section of the same die bail operated, the interposer engaged, and the die operated;

FIG. 11 is a partial section of the embosser assembly, showing both the punch and die during an embossing step;

FIG. 12 is a bottom view of the card indexing gear box;

FIG. 13 is a side view of the card indexing gear box;

FIG. 14 is a section of the bail shaft drive at the bottom of the stroke;

FIG. 15 is a section of the bail shaft drive at the start of the die dwell;

FIG. 16 is a section of the bail shaft drive at the top of the stroke;

FIG. 17 is a schematic view of the embossing logic; and

FIG. 18 is a schematic block diagram of the elements of the complete machine.

### DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIGS. 1 and 2 the card embosser is supported on a main support channel 20 to which is attached a vertically movable station housing 21. The height of the station housing is adjusted by adjusting jack screw 49 and held in position by housing clamp bolts 50.

At the bottom of the main support channel, and passing from station to station is horizontal main drive shaft 22. At each station the main drive shaft passes through lower gear box 23 which drives upper gear box 24 through vertical coupling sleeve 25. The upper gear box drives horizontal station drive shaft 26.

At each station there is a pair of eccentrics 27 which are driven by the drive shaft. Connected to each, and moving vertically, is eccentric arm 28. The upper portion of the eccentric arm is connected, first to drive link 29 for the die; second to drive link 30 for the punch and, third to die dwell control link 31.

Drive link 29 is connected to bail arm 34 which reciprocally rotates bail shaft 32 for the dies. Drive link 30 is connected to bail arm 35 which reciprocally rotates bail shaft 33 for the punches. Die dwell control link 31 is pivotally attached to station housing 21.

Spaced horizontally along the station are a series of cooperating sets of punches and dies, one for each alphabetic or numeric character to be embossed, each set placed in horizontal grooves for reciprocation, and each set supplied with interposers, springs, armatures and related assemblies which will be described initially for one set only of the identical punches and dies.

The card embosser has a common card guide 53 which runs past and through as many card embossing modules as are needed. The cards are fed from a conventional input hopper (not shown) by a mechanism (not shown) such as the one described in my application entitled Card Feed Mechanism, Ser. No. 58,128 filed July 24, 1970, into a conventional output hopper (not shown).

Shown in FIG. 1 are six magnet assemblies, three for the punches and three for the dies. As the complete magnet assembly is thicker than the punch and the die which they control, the magnets may conveniently be arranged

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in staggered relationship as shown. Magnet assembly 36, for one of the dies, has magnet coils 37. Each magnet assembly has an armature 38 which is pivotally operated and biased upwardly by armature spring 39. Each magnet assembly armature is inserted into a slot of interposer stop 40, respectively associated therewith.

Pivotally operated interposer 41 is biased by interposer spring 42 and hook 82. The machine may also contain electrical switch elements 43 and 44 which make contact when the interposer is activated. The signal is fed to the computer as an error check.

As shown in FIGS. 7 through 11 a card 52 is supported in a card track 53. The interposers are pivoted on common interposer pivot shaft 54. At the lower end of the interposer is the point 55 which is engaged by interposer stop 40, holding the interposer in the elevated position, and opposing the biasing spring 42. The end of the interposer tip 56 cooperates with a bail recess 57 and die tail 58 to operate the die, moving the die, and particularly die cavity 59, against the card to be embossed. A similar grouping of interposers operates each punch 60 to move punch tip 61 against card 52.

The movement of the card is controlled by an indexing means including a card indexing gear box 62 containing input shaft 63 connected to a constant speed drive source through input pulley 76 and as shown in FIG. 2, may be directly coupled by a pulley and drive belt arrangement to shaft 26, whereby the operation of the drive means for the embossing elements is synchronized with the indexing means. Attached to the input shaft and rotating therewith is worm gear drive collar 66. The drive collar contains a hole 67 in which pin 68 is free to reciprocate. The pin is connected to worm gear barrel cam 65 containing barrel cam groove 71. Cooperating with the groove is barrel cam guide pin 69 and guide pin bearing 70. Below the worm gear barrel cam and attached thereto is worm gear 64 which drives worm wheel 72 which is in turn connected to output shaft 73 journaled into output pulley 77 as shown in FIG. 3. The output pulley drives card index belt 74 with index belt fingers 75.

When more than one line is embossed adjacent modules are utilized as shown in FIGS. 3 and 4. Each module embosses one line and is set at the proper height relative to common credit card track 53 by adjusting set screw 49. The structure of the modules will vary in two respects depending on the size character embossed. This difference will be described for two industry standards, 7 and 10 characters to the inch.

The lateral disposition of pairs of punches and dies is shown in FIGS. 2, 3 and 4 as well as in cross section in FIG. 5 and in FIG. 6. The punches and dies operate in grooves 81 with intermediate walls 82 in the upper portion of station housing 21. As shown in FIG. 5, the centers of adjacent grooves are exactly twice the distance apart of the character spacing on the card. Thus the punch spacing is 3.5 and 5 per inch for the 7 and 10 character per inch modules.

Each module will necessarily have the same [throughout] throughput rate of cards. Likewise the machine is arranged for a common print cycle time for adjacent modules. Therefore, on the module with the 10 per inch characters the credit card moves 2.00 inches in 20 character cycles, during which time a point on the card will pass 10 punches. During the same 20 cycles a credit card on the 7 per inch character module will likewise pass 10 punches but will travel 2.86 linear inches in so doing.

The drive means for belts 74 are differentially geared to allow this differential speed and to compensate for this differential speed there are seven index belt fingers on the 7 character per inch module belt and 10 fingers on the 10 character per inch modules as shown in FIG. 4. The different finger spacing is observed in the gap between the front of the card and the leading finger.

A new development in credit cards is the punching of coded holes to allow the machine reading of these cards

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at sales stations with inexpensive photoelectric devices rather than the prohibitively expensive character readers. [Our] The present machine is adaptable to this since another module can be added with coded hole punches.

#### OPERATION

FIG. 17 schematically shows the sequence involved in embossing number 903514 onto a particular location on a plastic card 52. The card is moved incrementally from right to left through the machine and past the array of character embossing punches, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 0. The plastic card has moved several increments to the left before it is in a position to be embossed with characters or numerals 9 and 0 simultaneously. The card then continues to move incrementally to the left eight steps when the characters 3 and 5 are embossed simultaneously. The card continues to move incrementally to the left three steps to be embossed by character 4 and continues two more steps to be embossed by character 1. Now the card has been fully embossed with the complete character group 903514 at the desired area on the card.

It can be seen that any group of characters, numerals or alphabetic, can be embossed on the card in a similar manner. All that is required, as shown in FIG. 18, is for a magnetic tape reader 78 or other data sensor to read the desired sequence of numbers and for a computer 79 to translate that to the proper embossing sequence as the card is indexed through the card embosser or embossing station 80. The logic in the computer is similar to the logic used to control high speed computer printers of the drum type such as the model 4800 printer manufactured by Data Products Corporation, or the chain type such as model 1403 printer manufactured by International Business Machines, and is well known in the art. In view of this, no detailed showing is made of the card reader and computer logic which read the data input and translate that to the proper sequence of energizing the magnet coils which ultimately cause the embossing actions.

The combination of this electronic logic control with the reciprocating punches and dies allows the spacing of the punches at intervals different from the character spacing on the card. The illustrated machine uses a punch separation of exactly two characters. This separation is important in an embossing punch as opposed to a printing punch.

As best shown in FIG. 6 the die has a character-shaped cavity. If the dies are spaced apart the distance of the actual characters, then between adjacent dies there must be two character cavity walls. For a 10 character per inch die, the space between characters is less than one-sixteenth inch, thus limiting the wall thickness to less than  $\frac{1}{32}$ -inch thickness. This construction imposes severe strength limitations. Our construction allows adjacent cavity distances of nearly three-sixteenths, thus allowing much greater cavity wall thickness, including a beveled die face, if desired, with a much more rugged construction.

The first step in setting up the machine for embossing is to set the station housing 21 at the correct height to emboss characters at the desired level on the card. Quite frequently, two or more lines of embossed characters are required to be printed on each card. The drawings disclose a machine which embosses one level of printing at each station and when multiple levels of printing is desired the stations are connected together in tandem as shown in FIGS. 3 and 4.

The card indexing drive means advances the card one position between each embossing step in the machine cycle. The card index belts 74 of each station housing 21 pass the card from station to station by the cooperation of index belt fingers 75 of adjoining belts. Suitable input and output hoppers, not shown, inject cards onto the belts and receive and stack cards after embossing.

Any suitable means of indexing the card index belt 74 may be used. The disclosed card indexing means 70 transforms constant rotational motion into the proper in-

dexing and dwell sequence. Input shaft 63 of card indexing gear box 62 moves continuously. This drives worm gear drive collar 66 which in turn drives barrel cam 65 and attached worm gear 64 through the means of barrel cam pin 68.

The worm gear barrel cam and worm gear are slidably mounted on input shaft 63 so that while turning at the same velocity as the shaft, they may move up and down on the shaft under the influence of barrel cam guide pin 69 and associated barrel cam groove 71. The barrel cam groove is a spiral for the majority of the circumference exactly equal to, and in the same direction as, the pitch of the threads in worm gear 64. The short remainder of the barrel cam groove is a sharply inclined spiral to join the two edges of the longer spiral.

In operation, the above elements, during the majority of a single revolution of input shaft 63, cause no rotation of worm wheel 72. Although worm gear 64 is turning during this period the barrel cam is moving linearly to exactly nullify the influence of worm gear 64 on the worm wheel 72. During the shorter period of the cycle when the linear movement of worm gear 64 and barrel cam 65 is reversed by the reversed spiral of barrel cam groove 71, both the rotational movement of worm gear 64 and the linear movement of the barrel cam and worm gear cause worm wheel 72 and output shaft 73 to make a short but rapid rotational movement.

During operation, main drive shaft 22 and therefore station drive shaft 26 are operated continuously. This causes a continuous vertical reciprocation of eccentric arm 28 and therefore a continuous and opposite partial rotation or reciprocation of bails or bail shafts 32 and 33.

The embossing operation and the indexing of the card between embossing steps include movement of both the punch and die. When the card is being embossed, the die 51 must have its die cavity 59 constantly against the card. During this embossing operation the punch 60 moves its punch tip 61 into the card and out again in a continuous motion. The die must, however, remain stationary during what is called the die dwell time to prevent movement of the card. After the embossing is complete and the punch has withdrawn, the die must also withdraw to allow the card with its embossed characters to pass in front of the die and the die cavity where the embossed portion of the character was during the embossing operation.

The above mechanical operations are carried out by the proper geometrical arrangement of die drive link 29, punch drive link 30 and dwell control link 31 which is pivotally attached to station housing 21. A suitable arrangement is shown in FIGS. 14, 15 and 16.

The function of the dwell control link 31 is to impart a continuous reciprocal rotational movement to bail 33 for the punches and an interrupted reciprocal rotational movement to bail 32 for the dies. This is shown in detail in FIGS. 14, 15 and 16 where the bail shaft drive is at the bottom of the stroke in FIG. 14, at the start of the die dwell in FIG. 15, and at the top of the stroke in FIG. 16. Alternative geometric relations can also be employed so long as they result in the above desired functional relationship which allows the card to be embossed and allows the card to be indexed between embossing steps.

The arrangement of bail shafts 32 and 33 has an additional advantage. The shafts are supported along their entire operative length by the upper portion of station housing 21. The rotary motion imposes a twisting movement on the bail shafts and the load imposed by the embossers imposes a twisting movement on the bail shafts and the load imposed by the embossers imposes as well a lateral stress. As the shaft is supported along its length, this load does not result in a lateral flexing. The load imposed is 200 pounds per character and the machine must be designed for the simultaneous embossing of all characters or, for a 42 character set, something over 4 tons.

The electrical energization of the magnet coils must, of course, be in synchronism with the movement of the bail shafts and the indexing of the card. This is accomplished by timing disc 47 on the station drive shaft 26 and sensing head 48. The sensing head detects every time the drive shaft, and therefore the bails and the card indexing belt, which are interconnected, are in a certain position.

The embossing steps will now be described with particular reference to FIGS. 7 through 11. When, for example, the input data to the machine is that the card is to be embossed with a particular character, say, numeral 4, at a particular point on the card, this particular point will be indexed past the font of punch and die pairs into an aligned position between the punch and die containing numeral 4 as it will be indexed [past] successively into aligned positions with every other punch and die at the station. When the particular point on the card is indexed [past] into aligned position with the punch and die set containing numeral 4, the computer will send a signal to the magnet assemblies 36 for the punch and die, energizing magnet coils 37 and closing armatures 38. This closing of armatures 38 lowers the interposer stops 40 thus allowing the interposers 41 to rotate under the influence of interposer springs 42.

When the interposer stops 40 are elevated as shown in FIGS. 7 and 8 the reciprocal motion of the bail 32 keeps the die 51 in the withdrawn position and does not force it against the card when the bail is rotated into the operating position. When the interposer stop 40 is withdrawn as shown in FIG. 9 the interposer 41 rotates and the interposer tip 56 falls into bail recess 57 along with the die tail 58 as the bail assumes the withdrawn position. When the bail is rotated to the operating position as shown in FIG. 10 the interposer tip 56 forces the die against the card. The cooperating interposer for the punch similarly forces the punch against the die as shown in FIG. 11. During this portion of the cycle the interposer stops are again raised as shown in FIG. 11 and as the bail reciprocates back to the withdrawn position the interposer will be rotated slightly withdrawing the interposer tip from the bail recess. The embossing operation for each character to be embossed at the given index position has now been [complete] completed and the card may be indexed one character position.

The punch and die activating, or actuating, mechanism shown has in effect a short mechanical memory. The electronic signal can be of very short duration and does not need to be continuous during the entire punching cycle. The signal energizes the magnet assembly for the appropriate interposer stop, releasing it [.] from engagement with the associated interposer at point 55. The interposer tip 56 thus drops into the bail recess 57 under the force of its spring and is held there during the cycle by the spring for conveying the force of the bail [and] to the punch or die.

Switch elements 43 and 44 operate during a punching cycle. An electrical circuit from the computer to element 43 and from 44 back (not shown) is closed when interposer spring 42 and hook 82 are pulled against element 44. This signal is an error check, confirming that the intended embossing operation has taken place.

As shown in FIG. 14 the numbers are not all embossed on the card in the sequence of their location. During any one indexing cycle there may be no embossing actions or there may be several embossing actions, depending on the particular numbers desired to be embossed on the card and the location of those characters at the station housing.

As shown in my earlier application, the dies may be stationary and the punches alone may be selectively moved under the influence of a common reciprocating shaft and magnet controlled interposers during each index cycle.

The gist of the present invention is transforming the embossing instructions by electronic logic in order to simplify the mechanisms for embossing. Other means for

transforming the instructions to operate the punches and dies in the desired sequences are readily apparent.

I claim:

1. [In a] A credit card embossing machine [including] comprising:

- [a.] a [front] font of selectively operable character embossing punch and die pairs,
  - [b.] a continuously reciprocating drive means for operating said embossing punch and die pairs,
  - [c.] signal operated selective interposer means for each punch and die pair to engage said drive means and operate the respectively corresponding [said] embossing punch and die pair,
  - [d.] a card guide [traversing] for transporting a card past said font and between said punches and dies,
  - [e.] indexing means associated with said card guide for indexing a card in an indexing cycle past said embossing font, [the improvement comprising:]
  - [f.] [a medium having] means for sensing data from an input source [thereon] representing the characters to be embossed, and providing corresponding data signals, the data and the corresponding [g. means for sequentially sensing said] data signals being in a [said] sequence [representing] corresponding to the sequence of the character positions of the characters to be embossed on [said] the card, [and transforming said sensed data into electronic data signals,]
  - [h.] logic means to receive said sequential [electronic] data signals and to translate said sequence to a sequence correlating:
    - (1) the sequence of characters to be embossed on a card with
    - (2) the position of the card in said card guide in accordance with the successive indexing cycles of said index means and thus, in each index cycle, with the [selected] embossing die [pair] pairs available to be operated for embossing character positions of the card,
  - [i.] memory means to receive the data signals of said translated signal sequence and to store said signals,
  - [j.] means to generate from said memory means, in register with each index cycle, an interposer activating signal for each punch and die pair which said [previously read] data signal, as stored in said memory means in accordance with [and] said logic sequence translation means, [call] calls for selected engagement during said index cycle, whereby [said] data is sensed, translated, stored and called for as said card is indexed past said font of embossing [dies] punch and die pairs, and said embossing [sets representing] punch and die pairs as selectively called for in each index cycle by said data signals are activated into engagement to emboss the corresponding character in [as] the selected [portion] character position of the card [is indexed past said set].
2. In the combination[s] of claim[s] 1 the inclusion of a mechanical memory for said selective engaging means comprising:
- mechanical switching means,
  - means for delivering said interposer activating [an electrical punching] signal to said [a] mechanical switching means[,] for biasing said mechanical switching means in a punch[ing] activating position, means responsive to said mechanical switching means [switch] in said [punching] punch activating position selectively to engage the corresponding [said] punch [set] and die pair to emboss said card, whereby said electrical signal triggers said punching operation and said mechanical memory which carries out said selective engagement[.]
3. In the combination of claim[s] 1, [the combination of] a font of punch and die pairs wherein: [sets] each said die has walls defining a cavity therein conforming to a character to be embossed, and the corre-

sponding punch of the pair has a tip thereon conforming to that same character for urging said card into said cavity to emboss the said character on said card,

said punch and die pairs being spaced apart two or more character spaces, and

each of said individual punches and dies exceeding in width the spacing of successive character positions [space] on said card whereby an enlarged cavity wall is afforded on said die elements and strengthens said elements.

4. A system for embossing cards with characters of a pre-established set in predetermined positions along a specified line of character embossing positions on each such card wherein character data signals uniquely identify respectively corresponding ones of the characters, the sequence of particular characters to be embossed on a given card being identified by a corresponding sequence of the respectively corresponding character data signals, comprising

a plurality of character embossing elements respectively corresponding to the characters of said set, said elements being aligned in adjacent, successively displaced positions in a row and individually movable into and out of engagement with a card to emboss the card with the respectively corresponding character,

drive means operable in each of continuously repeating cycles to drive said elements into and out of embossing engagement with a card,

guide means for receiving, individually and in succession, a plurality of cards to be embossed and for transporting each said card in a direction parallel to the row alignment of said elements and with the line of embossing positions of the card aligned with said row of embossing elements,

indexing means for engaging, in succession, each card of a plurality of cards to be embossed and incrementally advancing each engaged card along said guide means to successive index positions in synchronism with the embossing cycles of said drive means, for successively aligning the card embossing positions with the embossing elements,

means for receiving and storing, in succession, a sequence of character data signals identifying the sequence of particular characters to be embossed on each of a plurality of cards,

means for storing an identification of the character and position of each embossing element and, in response to said index means and for each successive index position of a given card, deriving therefrom an identification of the character and position of the embossing elements currently aligned with the embossing positions of the card,

means operable at each successive index position of a given card for comparing the character and position identification of the embossing elements currently aligned with that given card with the stored sequence of character data signals for that same card, for each of the plurality of cards engaged and advanced by said index means, in succession, and producing an output designating each embossing element as to which correspondence obtains with the particular character to be embossed in the aligned embossing position of each such card, and

selective actuating means responsive to the outputs of said comparing means, to couple each embossing element designated thereby to said drive means for embossing position.

5. A system as recited in claim 4 wherein more than one line of embossing positions is defined on each card, spaced transversely of the direction of card transport, and wherein there are provided:

a number of said fonts of character embossing elements respectively corresponding to the number of

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lines to be embossed, and displaced along said guide means in the direction of card transport, said fonts being equal in number to the number of embossing lines defined for any given card and each row of embossing elements of each said font being positioned relatively to said guide means to be in alignment with the corresponding line to be embossed thereby,

said indexing means incrementally advances each of the plurality of cards to be embossed along said guide means to successive, aligned index positions relative to the embossing elements of each said font, for said plurality of fonts in succession, and

said character identification storing means is responsive to said indexing means to identify both the font and the embossing elements of the font with which the embossing position of a card are currently aligned.

6. A system as recited in claim 5 wherein:

said character data receiving and storing means receives a sequence of character data signals identifying in successive sequence the particular characters for each of the lines to be embossed on each card, and in succession for a plurality of cards to be embossed, and

said comparing means compares the character and position identification of the embossing elements of a given font with which the embossing positions of a given card are currently aligned with the stored sequence of character data signals for the corresponding line of that given card, for each successive index position of the given card, for all such cards and for the plurality of fonts, in succession.

7. A system as recited in claim 5 wherein at least one of the fonts affords embossing elements for embossing characters of a different configuration than that of another of said fonts.

8. A system as recited in claim 5 wherein each of the plurality of fonts has the same throughput rate of cards.

9. A system as recited in claim 5 wherein the character spacing of one of said line of character embossing positions differs from the spacing of another such line and wherein:

said indexing means includes separate incremental advancing means respectively associated with each of said number of fonts, each of said incremental advancing means incrementally advancing cards, in succession, along the said guide means simultaneously and in synchronism with the cycle of said drive means, and to successive index positions spaced in accordance with the character position spacing of the associated line of embossing positions, and said separate advancing means include card engaging means displaced to define spacings of successive cards advanced by each thereof, selected with respect to the spacing of successive index positions defined thereby to afford a common card throughput rate for all of said advancing means.

10. A system as recited in claim 4 wherein the spacing of adjacent embossing elements of said font is larger, by an integral number, than the spacing of adjacent character positions to be embossed on a line of a card and wherein:

said embossing elements include a pair of an embossing die and a related embossing punch, said die defining a cavity in the end thereof conforming to the character to be embossed and said punch having a tip portion conforming to that same character for engaging the card therebetween and embossing the card, and

the side walls of said die defining said cavity being of a dimension larger than the character spacing, thereby strengthening said die.

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11. A system for embossing cards with characters of a pre-established set in predetermined positions along a specified line of character embossing positions on each such card wherein character data signals uniquely identify respectively corresponding ones of the characters, the character and position identification of each of the embossing elements being stored in the system and the sequence of particular characters to be embossed on a given card being identified by a sequence of the respectively corresponding character data signals supplied to and stored in the system, in succession for a plurality of cards to be embossed, comprising

a plurality of character embossing elements respectively corresponding to the characters of said set, said elements being aligned in adjacent, successively displaced positions in a row and individually movable into and out of engagement with a card to emboss the card with the respectively corresponding character,

drive means operable in each of continuously repeating cycles to drive said elements into and out of embossing engagement with a card,

guide means for receiving, individually and in succession, a plurality of cards to be embossed and for transporting each said card in a direction parallel to the row alignment of said elements and with the line of embossing positions of the card aligned with said row of embossing elements,

indexing means for engaging, in succession, each card of a plurality of cards to be embossed and incrementally advancing each engaged card along said guide means to successive index positions in synchronism with the embossing cycles of said drive means for successively aligning the card embossing positions with the embossing elements,

means for receiving and storing, in succession, a sequence of character data signals identifying the sequence of particular characters to be embossed on each of a plurality of cards,

means responsive to said indexing means for deriving at each of the successive index positions of a given card, from said store of character and position identifications of the embossing elements, the said identification of the character embossing elements with which a card is aligned, and comparing the character and position identification with the stored sequence of character data signals for that given card and producing an output designating each embossing element as to which correspondence obtains with the particular character to be embossed in the respectively aligned embossing position, and

selective actuating means responsive to the outputs of said comparing means, to couple each embossing element designated thereby to said drive means for embossing the card in the aligned embossing position.

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WILLIAM B. PENN, Primary Examiner

**UNITED STATES PATENT OFFICE**  
**CERTIFICATE OF CORRECTION**

Patent No. Re. 27,809 Dated November 13, 1973

Inventor(s) Jacob H. Drillick

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 8, line 69; after "bossing" and before "position" insert

-- the card in the aligned embossing --.

Signed and sealed this 9th day of April 1974.

(SEAL)  
Attest:

EDWARD M. FLETCHER, JR.  
Attesting Officer

C. MARSHALL DANN  
Commissioner of Patents