

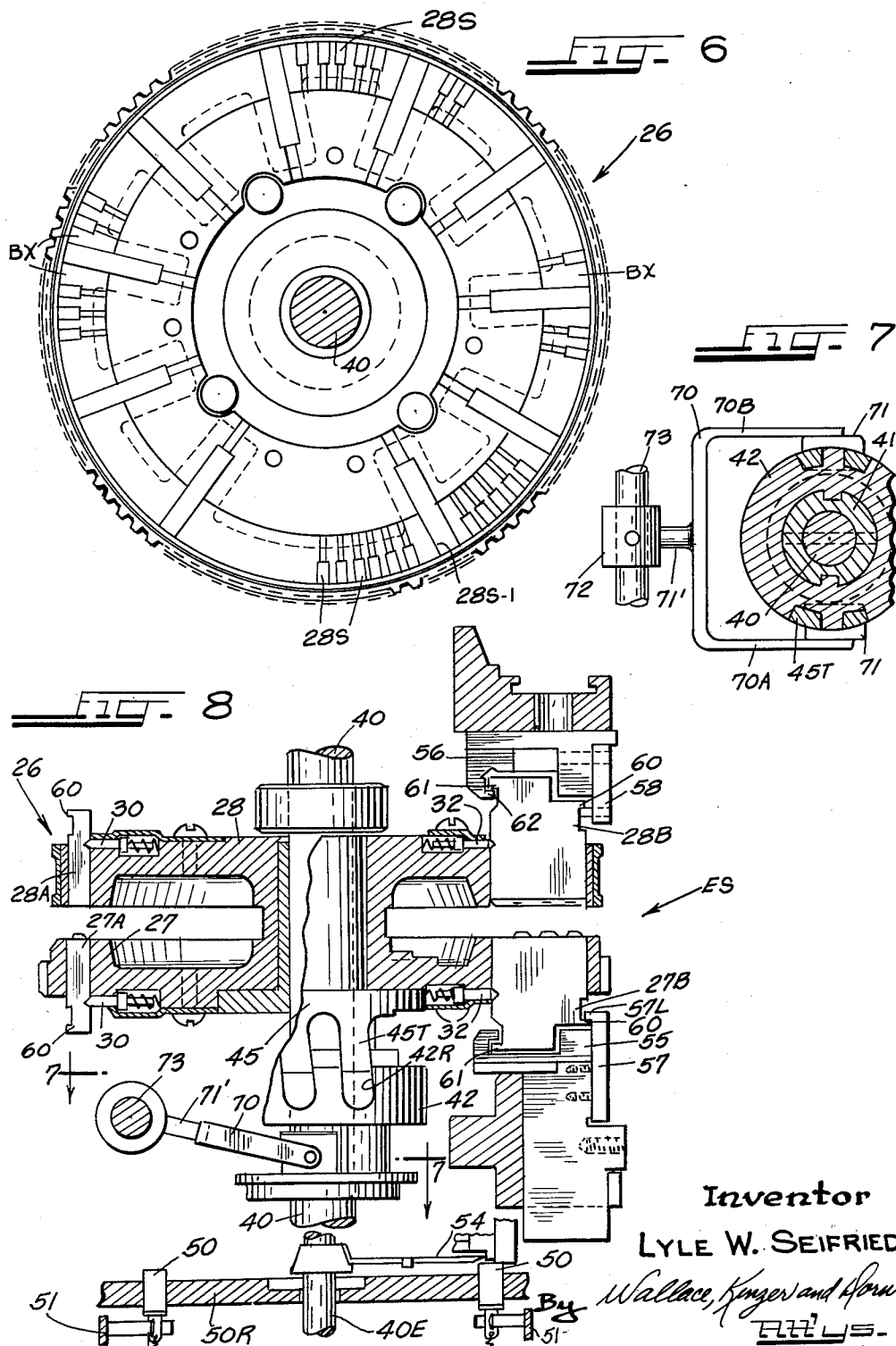
April 17, 1962

L. W. SEIFRIED
EMBOSSING MACHINE

3,029,920

Filed June 27, 1960

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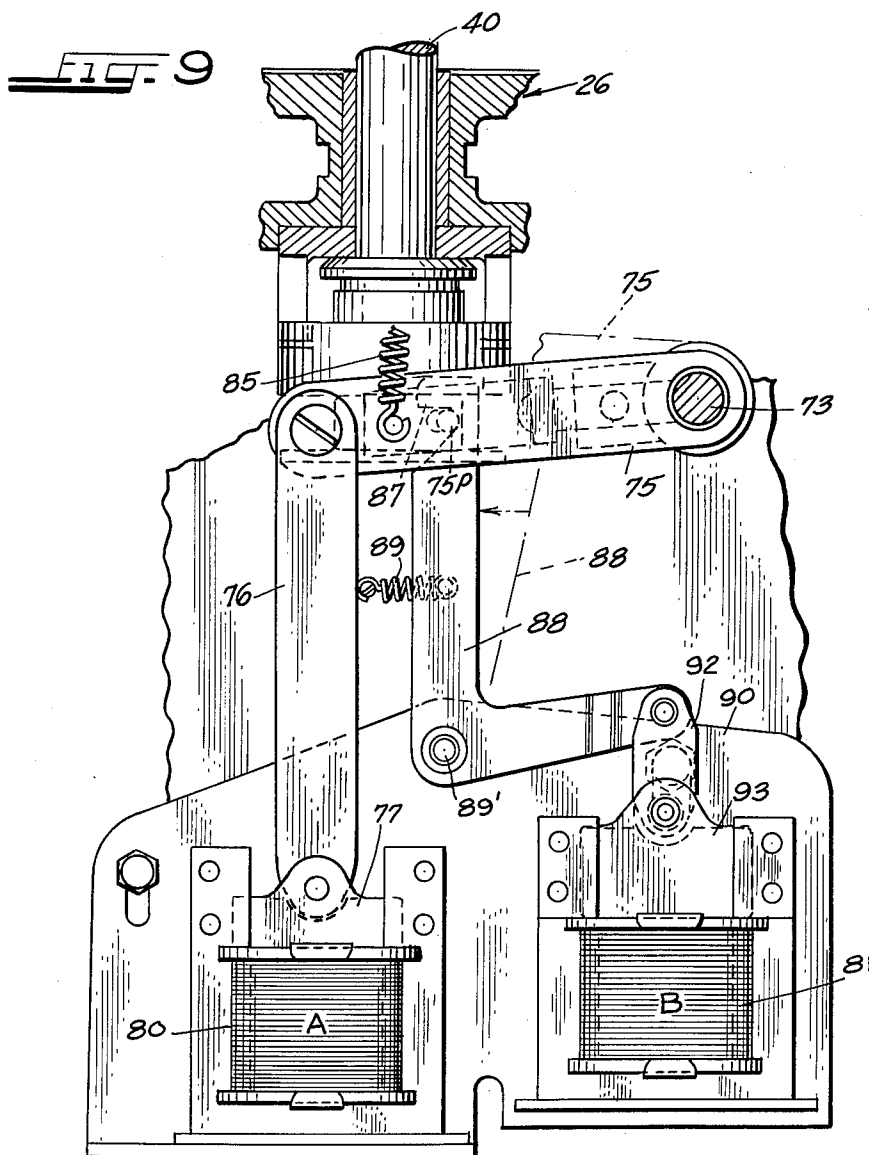
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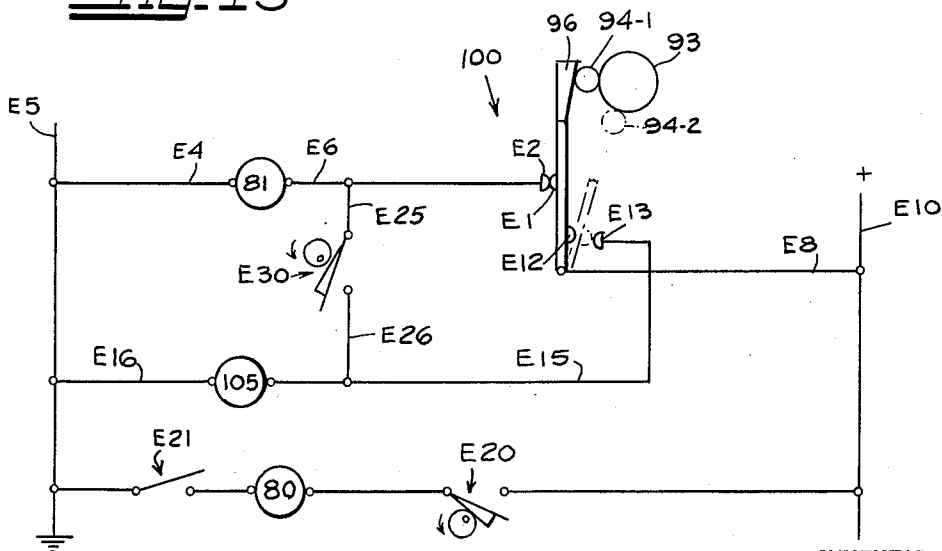
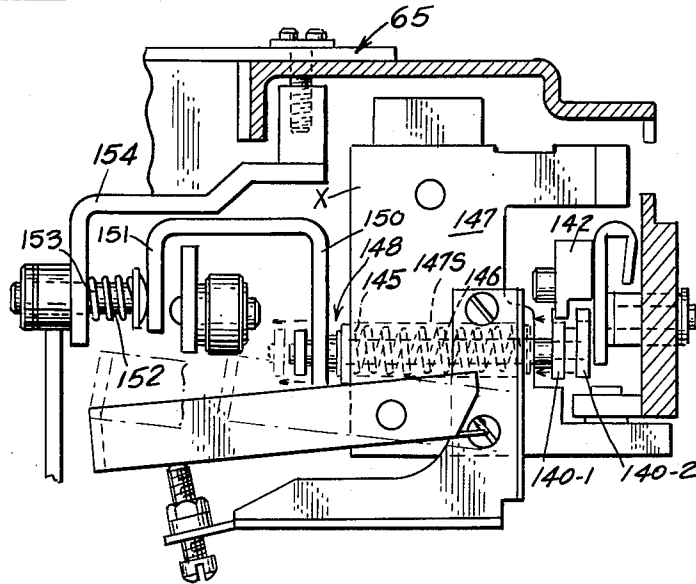
6 Sheets-Sheet 4



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3,029,920

EMBOSSING MACHINE

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11 Claims. (Cl. 197-6.6)

This invention relates to embossing machines of the kind used to produce embossures on relatively small plates that are to be used for imprinting purposes.

Repetitive printing of fixed and determined data is advantageously effected, and accurate and permanent record-keeping greatly facilitated, by having resort to relatively small printing plates bearing the fixed data in the form of embossed type characters. Such plates can be fed quite rapidly through printing machines of the kind which automatically produce corresponding imprints on record sheets, envelopes and the like. Printing plates of this nature can also be used in hand operated printing machines that are primarily used in connection with department store and oil service station credit transactions. In most instances, each plate bears a name and address which is to be imprinted. Additionally, each plate will usually bear accounting data such as a policy or social security number, customer designation and so on to be imprinted. Printing plates of this kind can also be used for tax accounting, inventory control, routing of parts in assembly factories and so on.

In order to facilitate the sorting and collation of business forms and the like, it has been proposed that such repetitive printing transactions be assigned codes and that such codes be related to stylized numerical characters that are easily scanned by photoelectric cells or other responsive scanning matrices.

Thus, accurate scanning is assured by stylizing the numerical characters to obviate the possibility of one numeral being confused with another in the scanning apparatus. At the same time, each numeral is assigned a code based on a five-bit code as will hereinafter be described, and this code can be imprinted on the business form by magnetic ink so that the imprinted code can be sensed or scanned by magnetically responsive devices.

Printing plates bearing such stylized numerals and code representations are produced, under the present invention, in an embossing machine. These data are to appear at certain assigned line positions on the resultant embossed printing plates apart from where are to appear alphabetical data and standard numerals that are merely to be used for imprinting intelligent data requiring no scanning. Accordingly, the primary object of the present invention is to so construct an embossing machine as to enable stylized numerical characters and code representations thereof to be embossed on a plate that is to be used as a printing plate in accordance with what has been described above, and to so construct the embossing machine as to assure that when stylized numerals and code representations thereof are being embossed, the chance of error is reduced.

Another object of the present invention is to so construct an embossing machine as to assure that when the plate being embossed is in a line location other than where the stylized numerical characters and code representations are to appear, the punch and die sets allocated to these data will be prevented from effective operation. Another object of the present invention is to enable the foregoing objects to be achieved as a combination in an embossing machine that requires relatively few operative parts to effect the combined results, and to do this in an efficient and inexpensive manner.

Specifically, an object of the present invention is to

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effect embossures by having resort to an embossing machine of the kind which includes a rotatable punch and die head under control of a shift mechanism adapted to index or shift the head from one punch and die position to the next, just prior to effecting the selected embossure. The stylized numeral and code punch and die slugs as a group are assigned to one of the shift or non-shift positions in the head, and certain of the remaining alphabet-type punch and die elements are assigned to the other positions. Each stylized number and the associated code are so related as to be embossed simultaneously. For reasons to be explained hereinafter, the shift mechanism is to be in an inoperative state when the carriage, which holds the plate being embossed, is in a certain line position, and the shift mechanism is then to be placed in an operative state when the carriage is in another line position. In other words, the position of the carriage, from a line basis, is to control the operative or inoperative state of the shift mechanism. Specifically, this is accomplished by holding continuously ineffective the lock for the shift mechanism when the carriage is in a first position, and conditioning this lock for effective operation when the carriage is in a second position. Additionally, when the carriage presents the plate for the embossing of normal alphabet and numeral characters, the punches and dies assigned to the embossing of stylized numerals and associated code representations are to be rendered ineffective. These specific features represent specific objects of the present invention.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what is now considered to be the best mode contemplated for applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

FIG. 1 is a perspective view of an embossing machine embodying the features of the present invention;

FIG. 2 is a plan view of a printing plate embossed in accordance with the present invention;

FIGS. 3A and 3B are fragmentary views on an enlarged scale of punch and die slugs used for code embossing under and in accordance with the present invention;

FIGS. 4 and 5 are views illustrating plans respectively for the stop ring and punch and die head of the machine;

FIG. 6 is a plan view of the punch head;

FIG. 7 is a fragmentary sectional view substantially on the line 7-7 of FIG. 8;

FIG. 8 is a sectional view through the punch and die head;

FIG. 9 is an elevation, partly in section, showing the relationship of certain solenoids;

FIG. 10 is a fragmentary elevation showing the relationship of another solenoid in the machine;

FIG. 11 is a compound view, somewhat schematic, illustrating the relationship between line positions of the carriage and embossed line positions on the embossed item;

FIG. 12 is a sectional view illustrating further carriage aspects; and

FIG. 13 is a wiring diagram.

In FIG. 1 of the drawings there are illustrated an embossing machine 20 that is adapted to emboss a plate as P, FIG. 2, of plastic or other easily deformable material so as to form raised, direct reading type characters

thereon inclusive of ordinary alphabetical characters AC and numerals ON delineating a name, address or the like, and additionally stylized, easily scannable, oversized numerical type characters NC and code representations CR thereof. The stylized numerals and codes are to be in the "first" line position on the plate, and the alphabet characters in any subsequent line position, but this obviously can be varied.

A plate as P can be of a size to be conveniently carried in a wallet, and the plate P is particularly adapted to be used in imprinting apparatus such as hand-operated printing machines and the like to imprint forms not only with a name, address or like alphabetical data, but also with stylized or specially configured numerical data and the associated code representations thereof derived respectively from the embossures NC and CR. The numbers NC and the code representations CR are configured and designed to be easily sensed or read as by photoelectric or magnetic-responsive equipment. Thus, code representations as CR for imprinting are primarily of advantage in connection with automated accounting systems wherein duplicate charge slips, tabulating cards or the like imprinted therewith are sensed, sorted and collated in accordance with the code data thus imprinted thereon.

As shown in FIG. 2, each Arabic numeral NC has one or more code bars assigned thereto, and these code bars are in accurately oriented positions shown by parenthetical numbers. There are five possible positions for the code bars, and hence the code is a five-bit code. The numeral "1" has two code bars in positions (1) and (5); numeral "2" has two code positions respectively in positions (1) and (4); numeral "3" has two code bars in positions (4) and (5) in effect representing a single long bar; and so on, but each numeral does require two bits or bars for representation, a binary code in other words.

Under the present invention, the embossures AC, NC and CR identified in FIG. 2 are capable of being embossed in a machine as 20, which is to say that the present invention makes it possible not only to emboss a plate as P with ordinary alphabet and number characters AC and ON but also with stylized, scannable numbers and associated code representations of the numbers. Inasmuch as each stylized number NC is to be accompanied by a code representation CR, each such number and the code representation thereof under the form of the invention here disclosed are embossed simultaneously in a particular line position of the plate undergoing embossing as will be explained. Such can be in any selected line position of course, but for purposes of explanation hereinafter it will be assumed that this will be the first embossing line position of the carriage which supports the plate being embossed. Consequently, normal alphabetical and number data such as a name, street address or the like will appear in remaining line positions on the plate P, and in this connection it should be pointed out that ordinary sized and configured numbers ON can be provided in the areas where the alphabet data are to appear.

Referring momentarily to FIG. 11, it will be noted that the first line position where the stylized numerical type characters and the code bars are to appear on a plate as P represents a relatively wide area on the plate whereas the alphabetical type occupy a much smaller line area. It will be appreciated that FIGS. 2 and 11 are merely exemplary of relationships, which is to say that the number of lines of embossed alphabetical characters will depend upon the intended purpose of the plate as P. In other words, while a name only has been illustrated in FIGS. 2 and 11, other lines may be allocated to additional data such as a house number and street identification.

The blank plates that are to be embossed in the machine 20 are stored in a supply magazine SM, FIG. 1, and these blank plates are advanced to an embossing station ES where the plate is positioned in the jaws of a carriage incidental to having the embossed data formed thereon in a manner to be explained in detail hereinafter.

Inasmuch as the plates P may be of a white plastic, it is advantageous under some circumstances to face the raised surfaces of the type characters with a distinct color. This can be accomplished after embossing has been completed by advancing each embossed plate to a tipping station TP, FIG. 1, where a film bearing offsettable pigment material is pressed by a heated platen against the upper faces of the embossed type characters to cause distinctive coloring material to be offset thereto. This completes the formation of a plate as P, and each plate thus completed is advanced into a collecting tray TR at a collecting station CS.

Operation of the machine 20 is automatically controlled by a punched tape T, FIG. 1, which bears punched hole data instructions for automatic plate feed and positioning; plate loading and release; character and line space movement of the carriage, and so on in accordance with the disclosure in United States Patent No. 2,533,366. Thus, the tape T is read at a reader unit RU, FIG. 1, and bears all the instructions needed for fully automatic operation including the feed of the tape itself and the operation of key bars as will be hereinafter mentioned. Inasmuch as such automatic operations are fully disclosed in the above-identified patent, and constitute no part of the present invention, such disclosure need not be repeated herein.

Thus, the present invention is primarily concerned with the construction of an embossing machine enabling stylized numerical type characters and associated code representations thereof to be embossed, and in particular under circumstances where assurance is had that an alphabet character will not be inadvertently embossed during the embossing of the stylized numerical type characters and their code representations, and conversely. This assures that the codes will appear on the embossed plate only where they should, and assures that the alphabet characters and ordinary numbers ON appear on the embossed plate only where they should. As a consequence, accurate imprints and accurate scanning are assured. The embossing machine 20 includes a top hood 25, FIG. 1, in which is housed a rotatable punch and die head member 26, FIGS. 6, 8 and 9, including a lower circular punch section 27 and an upper circular die section 28. These are rotated in a manner to be described hereinafter, and located about the periphery thereof are related punch and die sets which include ordinary alphabet and number punches 27A, FIG. 8, and related dies 28A. The alphabet punch and die sets are relatively small in size in comparison to the stylized numerical and code punch and die slugs to be described hereinafter, and are arranged in relatively narrow slots as 28S, FIG. 6, arranged about the periphery of the member 26. Each punch and die element as 27A and 28A is movable to an actuated position in the related slot as 28S to effect an embossure, but is normally maintained in a retracted idle or ineffective position by spring-biased plungers 30, FIG. 8. Such embossing movement occurs only when the punch and die shuttle mechanisms as 31, FIG. 1, are interposed as will be mentioned hereinafter.

The punches and dies that are used to emboss simultaneously the numerical characters and their code bar representations are identified at 27B and 28B in FIG. 8, and a typical form is shown in detail in FIGS. 3A and 3B for the numeral "8." These punch and die slugs are quite large in comparison to those allocated to the alphabet characters as will be apparent from FIG. 8. Thus, the slugs 27B are not only configured to represent stylized, special form numerals as "8," FIGS. 3A and 3B, but also the two single form pips or bars that are to afford the code representations thereof. In order to maintain symmetry and balanced inertia, the numerical and code punch and die slugs are of the same size and hence must be sufficiently large not only to carry the large stylized numerals but also to afford sufficient space to account for

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the five possible locations of the single element code pips or bars CR' and CR'' as will be evident from FIGS. 2, 3A and 3B. Whether there is but a single pip (relief and intaglio in the punch and die) or several, depending upon the code for the related numeral, each is elongated and centered on the center line of the stylized numeral as will be evident in FIGS. 3A and 3B.

In view of the foregoing, the punch and die sections of the punch and die head are provided with relatively large slots as 28S-1, FIG. 6, spaced substantially uniformly about the circumference thereof, and slugs 27B and 28B are retained in position therein by spring-biased plungers 32, FIG. 8, so as to be normally held retracted in ineffective or non-embossing position. Embossing movement is imparted to the slugs 27B and 28B in the same manner as above described in connection with the alphabet or ordinary slugs 27A and 28A.

During operation of the machine, the head member 26 is continuously rotating, and such motion emanates from a rotatable shaft 40. A collar 41 is pinned to the shaft 40, as will be evident in FIG. 7, and a vertically shiftable clutch sleeve 42, constituting part of the shift mechanism to be referred to hereinafter, is splined to the collar 41 so as to be rotated therewith. A collar 45 is secured in a fixed position to the punch and die head 26, and this collar is provided with tooth projections 45T which normally are disposed deeply in camming recesses 42R in the shift sleeve 42 to impart the drive to the rotatable punch and die head 26. In FIG. 8, however, the shift sleeve 42 is shown in its dropped or shift-producing position for reasons hereinafter to be explained, and such position is related to the actuated or energized state of a solenoid to be described.

The foregoing construction of the punch and die head is disclosed in Patent No. 2,115,456, and as further explained in that patent, a ring of stops 50, FIG. 8 hereof, is arranged in a disc 50R well below the punch and die head 26. These stops are accurately oriented with respect to the punch and die slugs 27A-28A and 27B-28B and are arranged to be actuated by selected key bars 51 such that when a particular key at the keyboard of the machine is actuated manually or as the result of punched tape control, the related key bar is lifted as viewed in FIG. 8 raising the associated stop 50 to dispose the stop 50 in the path of a stop arm 54 carried on a lower extension 40E of shaft 40. Thus, the stops 50 are so related to the key bars 51 as to occupy positions in the ring 50R corresponding precisely to a punch and die slug that afford characters corresponding to the key that was actuated, and when a key is operated, the particular punch and die set will be located accurately at the embossing station ES, FIG. 8, in position to effect a corresponding embossure.

Such embossing is effected by imparting actuating forces to a punch and die assembly that has been located at the embossing station, and such forces are established by respective punch plungers as 55 and die plungers as 56 that are actuated only when the shuttle mechanisms as 31, FIG. 1, are interposed between the plungers and the plunger operating or anvil mechanism as described in aforesaid Patent No. 2,115,456.

After an embossure has been effected, the previously actuated punch and die set is restored back to ineffective position upon return or restoration of the plungers 55 and 56 by stripper fingers 57 and 58 thereon which have projecting hooks or lugs at 57L engageable with complementary projections as 60 formed not only on the stylized punch and die slugs 27B-28B but also on the ordinary sized slugs as shown in FIG. 8. Single projections as 60 are sufficient to enable proper stripping of the normal sized alphabet slug to be effected, but in view of the relatively large size of the punch and die code slugs, which are twice the width of the ordinary alphabet and number slugs, these are provided with additional projections 61

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engageable by supplemental stripper fingers 62 carried by the plungers 55 and 56.

The stylized numerical and code slugs as a group occupy definite positions 28S-1 in the punch and die head as has been explained. The alphabet slugs as another group are disposed in repeated series thereamong at positions 28S. The general plan of this arrangement is shown in FIG. 5, and in FIG. 4 is shown the disposition and allocation of stop bars 50. The space in the punch and die head is blanked at BX, FIG. 6, on either side of a numeral and code slug, which is to say that the positions BX are not occupied by punch or die elements. However, the slots 28S-1 are centered on the center line of the equivalent of a slot 28S, or in other words each slot 28S-1 occupies in effect the equivalent of two slots 28S. Noting that the stops 50 are related to the centers of the slots 28S, means are afforded under the present invention to assure that none but stylized numeral and code embossures will be embossed on the plate P when it is in a corresponding numeral and code embossable line position at the embossing station ES, FIG. 8, and to assure that none but alphabet characters will be embossed when the plate is in an alphabet embossable line position. This entails an explanation, first, of the operation of the shift sleeve 42, and secondly a consideration of movement of the carriage 65, FIGS. 11 and 12, which has jaws 66 for gripping and presenting to the embossing station the plate P to be embossed.

The operation of the parts illustrated in FIG. 8 is one wherein the punch and die head 26 is rotated by having the ends of the prongs or teeth 45T deeply seated in the slots 42R to enable rotation of the punch and die head to be effected during rotation of the shaft 40. The slots 42R are slanted such that by dropping the shift sleeve 42, the punch and die head will be shifted or indexed one space center-to-center with respect to the slots 28S. This effective shifting of the punch and die head is, under the present invention, allowed to occur only when the carriage is at a line where the alphabetical characters and other normal characters such as a period, "and sign," normal sized numerals, and so on are to be embossed separate and apart from the stylized numbers and their code representations. In other words, the punch and die slugs for the stylized numerals and code representations are restricted to the non-shift positions in the head member 26, and in order to prevent missed or improper embossures and to prevent damage to the machine when stylized numbers and code representations are to be embossed, the shift mechanism to be further described hereinafter is disabled from effective operation when the carriage presents the plate in its "first line" position where such special embossures are to appear.

On the other hand, when normal embossing is to occur in a different predetermined line on the plate, the shift mechanism is to be rendered operable to permit the punch and die head to be indexed when required say from an upper case "C" to the lower case counterpart or from upper case "T" to normal sized numeral "5" as will be evident from FIG. 5. The shift signals will be punched in the tape when the machine is tape controlled. The "shift" positions are identified at SH in FIG. 5 and include the BX or blanked positions. All others are non-shift positions. The stylized numeral positions in FIG. 5 (non-shift) are evident from the over-sized numbers shown in FIG. 5. In further explanation, it will be noted that some of the stop bars 50 in FIG. 4 are allocated to the two possibilities, namely, "shift" and "non-shift." Thus, stop bar 50A is allocated to the ordinary numeral "4" as well as to alphabet character "R"; the numeral is a "shift" character, the letter is a "non-shift" character. So with "C" and "c" to which stop bar 50B is allocated.

As shown in FIGS. 7 and 8, a shift yoke 70 is provided, and this yoke includes a pair of arms 70A and 70B each having a shoe 71 at the free end thereof disposed beneath the enlarged head of the shift sleeve 42. The arms of

the yoke are pivotally connected to the associated shift sleeve shoes. An arm 71' is affixed to the bight portion of the yoke 70, and this arm is secured to a boss 72, FIG. 7, which in turn is pinned to a horizontally extending shift rod 73. The shift rod 73 is in the nature of a rock shaft and is so arranged in the machine as to be clamped to one end of an operating arm 75, FIG. 9, which extends at right angles to the shift rod 73. The arm 75 is pivotally linked at its opposite end to the upper end of a vertically extending solenoid-controlled actuating link 76. Link 76 at its opposite or lower end is connected to the armature 77 of a solenoid 80. This solenoid and a related solenoid 81, FIG. 9, are located below and at the right-hand side of the cover or hood 25 shown in FIG. 1.

The shift rod 73 tends to be biased clockwise as viewed in FIG. 9 (counter-clockwise as viewed in FIG. 8) by a relatively strong return spring 85 which is so tensioned on arm 75 as to apply a relatively strong upward holding force to arm 75, and it will be realized that the armature of solenoid 80 acts in opposition to the return spring when solenoid 80 is energized. Thus, the spring 85 tends to urge the shift yoke 70 upwardly to its normal position whereat the shift sleeve 42 is held upwardly with the teeth 45T seated deeply in the recesses 42R, and this characterizes the normal or non-shift state of the punch and die head. This normal condition is to prevail during embossing of stylized numerals and associated code bars.

When the shift mechanism is conditioned to be in an operative state hereinafter described, arm 75 is to be locked in its "down" position to maintain any shift that may be originated. This is accomplished by a hook 87 at the upper end of a bell crank 88, FIG. 9, which is pivoted at 89' on a pin supported by the bracket 90 which in turn supports the solenoids 80 and 81 in the machine. The right-hand leg of the bell crank 88 as viewed in FIG. 9 is connected by a freely pivotal link 92 to the armature 93 of solenoid 81.

A pin 75P, FIG. 9, is affixed to the inner face of arm 75 and in position to be latched or held by hook 87 on the bell crank 88. Thus, when solenoid 80 is unenergized, pin 75P is disposed above hook 87. The adjacent surface of the hook 87 is slanted or cammed to enable the pin 75P to move freely downward past the hook 87, causing bell crank 88 to shift, in the event that solenoid 80 is energized to cause arm 75 to be rocked counter-clockwise as viewed in FIG. 9. When the pin 75P passes under the hook 87, the bell crank 88 snaps back into place in latching relation over the pin 75P under the influence of its return spring 89, thereby latching arm 75 in the "down" position shown in FIG. 9. This of course is manifest in the shift sleeve 42 being allowed to drop substantially to the position shown in FIG. 8 causing the punch and die head 26 to be indexed through a shift space. If a shift is called for in an embossing cycle, the shift is effected just prior to the embossing operation.

On the other hand, if solenoid 81 is energized, then the bell crank 88 is shifted to its ineffective position shown by dotted lines in FIG. 9 whereat the hook 87 is out of the path of the pin 75P. If solenoid 80 should be energized at the same time, and it should be noted that this is a momentary energizing condition in actual operation, pin 75P will in effect skip hook 87, whereafter the return spring 85 takes over thereby canceling out any shift of the punch and die head.

Under and in accordance with the present invention, the shift mechanism thus described is to be placed in an effective or operable state only when normal sized alphabet, numerical and related characters are being embossed, since it is at this time that it may be necessary to impart a conventional shift to the punch and die head as may be required by the punched hole data carried by the tape which controls the machine. Thus, if the data being embossed in the alphabet area of the plate P include characters such as a normal sized and shaped nu-

meral "5," or a lower case "c," which are shift characters, the control tape will be punched to designate energization of solenoid 80 to produce the corresponding shift in the punch and die head, and under these circumstances solenoid 81 is to be allowed to remain de-energized so that latch 87 can perform its essential holding function to maintain and assure the shift position of the punch and die head. However, in order to prevent this condition from arising at the time when the stylized numerals and associated codes are being embossed solenoid 81 is placed under control of the carriage such that when the carriage is in position to present to the embossing station the line on the plate that is to be code-numeral embossed, solenoid 81 is held continuously energized thereby rendering the shift mechanism ineffective continuously so long as the carriage is in this position.

In view of the foregoing, and referring to FIG. 11, it will be noted that the carriage 65 is equipped with a conventional line spacing rack 90 having line spacing teeth 90T meshed with a line space control pinion 92. This is a known arrangement in the art and is described in several patents assigned to the present assignee, and it should be noted that operation of the pinion 92, in automatic operation of the machine, is under control of electric circuitry that in turn is responsive to punched hole data in the tape T used for such automatic control over the machine. Under the present invention, however, shaft 93 which carries the pinion 92 is provided with a cam element 94 adapted to engage the switch finger 96 of a control switch 100. This switch 100 is a double pole switch. The relationship is such that when the pinion 92 has positioned the carriage rack 90 to present the first embossing line of the plate P to the embossing station to enable the stylized numerals and associated code pips to be simultaneously embossed, cam 94 presses the switch finger 96 to the position illustrated in FIG. 11, and this completes a circuit to solenoid 81 as will hereinafter be described. In this manner, the shift mechanism is rendered inoperable when the plate P is in such an embossing line position. It will be appreciated that any line position of the plate P can have this characteristic feature under and in accordance with the present invention.

Movement of the carriage 65 to the left as viewed in FIG. 11 characterizes movement of the plate being embossed from its first line or code-numeral embossing position to its second position where the normal sized and conventional characters are to be embossed thereon. This a relatively large movement as will be evident from the legends in FIG. 11 and is characterized by approximately an 80° turn of the pinion 92 and its shaft 93. This of course displaces the cam 94 from contact with switch finger 96 which thereupon opens the poles that maintain the solenoid 81 energized. Consequently, solenoid 81 is returned to a de-energized state where the bell crank 88 will be effective as a lock to maintain any shift condition called for by the punched tape and manifest in energization of solenoid 80. At the same time, when switch finger 96 moves to its dotted line position illustrated in FIG. 11, another set of poles of switch 100 are thereupon closed to complete a circuit to a solenoid 105, FIG. 10, which disables those key bars 51 which might, because of an error in encoding the control tape T, be operated to select a punch and die having a stylized numeral and associated code. This should not be permitted to occur when the plate being embossed is in its second or normal alphabet and numeral position, not only because of character space requirements as will hereinafter be evident, but also because such would result in a false plate.

Thus, referring to FIG. 10, it will be noted that each key bar 51 is pivotally connected to a downwardly extending connecting link 106, and the lower end of the connecting link is formed with a slot 107 which extends

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inwardly from one edge of the link 106. A transmitting lever 110 is afforded to actuate each key bar link as 106, and one end of this lever is pivoted on a supporting shaft 112. The transmitting lever extends from the shaft 112 in the direction of the link 106, and a pin 115 at the free end of the transmitting lever is normally disposed at the closed end of the slot 107.

As described in Patent No. 2,533,366, rockers (120 hereof) are adapted to be rocked clockwise as viewed in FIG. 10 hereof in response to the data carried by the punched control tape, such rocking motion being induced by a code bar (not shown) positioned during sensing of the punched hole data in the control tape. When so rocked, each rocker 120 presses on the toe 121T of a realted hook lever 120 which, it should be noted, is also pivotally related to the shaft 112. Each hook lever 120 carries a pin 122 which is disposed in a slot 123 in the transmitting lever 110, such that in response to actuation of the rocker 120 the transmitting link 110 is pivoted clockwise as viewed in FIG. 10, and therefore motion is transmitted by pin 115 to the connecting lever 106 which in turn actuates the key bar 51 to institute selection of the corresponding punch and die set.

Under the present invention, those of the ten connecting links 106 (0 through 9) that are associated with the key bars 51 which select the code and numeral punch and die slugs are interconnected by a bail bar 130 which in turn is connected to the armature 131 of the solenoid 105. This bail bar has portions disposed in slots 132 that are common to the heads 106H of the ten links 106 that are assigned to the key bars 51 of the code and numeral punch and die slugs. Therefore, when the armature 131 is pulled to the right as viewed in FIG. 10 upon energization of solenoid 105, the bail bar 130 is effective to rock this group of ten connecting links 106 simultaneously to present an upwardly opening slot 133 in the head 106H of each such link to the pin 115 of the associated transmitting lever 110. Therefore, if such transmitting lever 110 should be operated erroneously at a time when the plate P is in its second line embossing position, the result will be idle motion manifest in the related pin 115 moving idly down in the slot 133, and consequently the key bar 51 for such erroneous condition will not be actuated.

It will be recognized particularly from FIGS. 2 and 11 that there is a great deal more space between the embossed and coded numerals NC on the one hand, and the conventional embossed data AC and ON on the other hand. Thus, there is to be a different degree of character spacing between the large embossures when the plate being embossed is in its first line position in comparison to character spacing between the smaller embossures when the plate is in its second line embossing position. Referring to FIG. 12, this is made possible by having resort to a pair of character spacing racks 140-1 and 140-2 which control character spacing of the carriage 65. Each rack is individually engageable by the usual escapement pawl 142 that is effective between successive embossures to permit the carriage to undergo character spacing movement in a manner well known in the art. When the carriage 65 is in what corresponds to the first line embossing position of the plate P, the escapement pawl is disposed in association with the character spacing rack 140-1 which has widely spaced teeth corresponding to the relatively wide jumps required when indexing the carriage left to right during the course of successive formations of the stylized numerals and associated code bars.

The racks 140-1 and 140-2 are controlled by a spring-biased plunger 145. A biasing coil spring 146 surrounds the plunger 145 and this assembly is disposed in a guide opening 147S formed in a fixed member 147 which affords part of the guide structure for the carriage 65.

The arrangement for the spring is such that the spring 146 applies a leftwardly directed force, as viewed in FIG.

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12, against a washer and spacer 148 at the left hand end of the plunger 145. This force is resisted by the right hand leg of an inverted U-shaped bracket 150 which embraces the adjacent end of plunger 145. The opposite or left hand leg 151 of this bracket bears against the head of a spring-biased plunger 152 having a concentric spring 153. Plunger 152 is supported by an arm 154 depending from and secured to the underside of the carriage 65. Spring 153 in effect loads or compresses spring 146.

When the carriage 65 moves from its first to second position as above described, plunger 152 is moved away from bracket 151 thus permitting spring 146 to take over, and plunger 145 is allowed to shift to the left as viewed in FIG. 12 until rack 140-1 bears against the solid surface immediately adjacent thereto. As a consequence of this, the character spacing rack 140-2, having the closely spaced teeth, becomes associated with the character spacing escapement pawl 142.

The control circuit for solenoids 80, 81 and 105 is shown in FIG. 13. With cam 94 in the first position of the carriage (stylized numeral and code embossing) indicated at 94-1 in FIG. 13, switch finger 96 is positioned to close contacts E1 and E2. Solenoid 81 is connected by a wire E4 to a wire E5 connected to ground. Solenoid 81 is connected to contact E2 by a wire E6; and the conducting element of switch arm 96 carries contact E1 and is connected to a wire E8 which in turn is connected to wire E10 in the positive side of the circuit. Consequently, under this condition, solenoid 81 is held de-energized to disable the shift latch, and no shift condition will be maintained even though solenoid 80 should be energized.

The conductive element of switch arm 96 includes a contact E12 adapted to engage a related contact E13 when cam 94 moves to its second, dotted line position 94-2 shown in FIG. 13. This occurs when shaft 93 turns during movement of carriage 65 to its second position. Contact E13 is connected by a wire E15 to one side of solenoid 105, and the other side of solenoid 105 is connected by a wire E16 to wire E5. Therefore, in the second position of the carriage, solenoid 81 is de-energized to enable the shift latch to be effective, and solenoid 105 is energized to prevent any effective action of the punch and die elements 27B-28B. The shift solenoid 80 may now be effective to produce a shift of the punch and die head. Thus, solenoid 80 is adapted to be energized provided switches E20 and E21 in its circuit are closed. Switch E20 is a cam-operated timing switch and switch E21 is a switch responsive to the sensing of punched hole data in the tape T calling for a shift character to be embossed.

In order to release the holding latch 87 after a shift character has been embossed, solenoid 81 should be energized, and a separate circuit for this effect is provided. Thus, wires E25 and E26 are connected to and shunted between wires E6 and E15, and a timing switch E30 is interposed therein so that solenoid 81 will be energized late in a shift embossing cycle so as to release latch 87.

It will be appreciated that while the present machine has been described from the standpoint of automatic tape control operation, a manual operation can be effected as well, in which event the key bars instead of being tape controlled will be mechanically controlled and a shift key can be provided to effect closure of switch E21.

It will be seen from the foregoing that the present invention enables printing plates of the kind described to be embossed to bear stylized numerals and code representations thereof in addition to normal alphabet and numerical characters. Accidental embossing of stylized numerals and code representations is prevented by disabling the associated key bars when the carriage is located to present the plate being embossed in the line position whereat the normal or standard characters are to be embossed, and at this time the shift mechanism is condi-

tioned to be in an effective state. On the other hand, when the carriage is in a location where the plate is to be embossed with stylized numerals and code representations thereof, the shift mechanism is rendered inoperable or ineffective, and this assures that the punch and die head will not be indexed through a shift movement at the time when stylized numerals and code representations are being embossed. Advantageously, each stylized numeral and related code representation is provided in relief and intaglio form on respective one-piece punch and die slugs, and the corresponding configurations are centered with respect to one another and with respect to the particular slug involved.

Hence, while I have illustrated and described a preferred embodiment of my invention, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In an embossing machine wherein selectable punch and die sets are arranged at assigned positions in a rotatable punch and die member, and wherein an embossable plate or the like is to be presented to a selected punch and die set in embossing position by a carriage adapted to undergo line spacing movements: first punch and die sets allocated to and configured for the embossing of numeral characters and the simultaneous embossing of associated code representations thereof, said first punch and die sets having certain assigned positions in said member, other punch and die sets occupying other assigned positions in said member and being allocated to and configured for the embossing of other characters, means to enable selected ones of said punch and die sets to be operative on said plate in an embossing operation, shift mechanism for shifting said member through a predetermined punch and die indexing movement prior to effecting an embossure, means settable by and at a predetermined line position of said carriage, where said numeral characters and code representations are to be embossed, to prevent effective operation of said shift mechanism and being disabled when said carriage is at another line position where said other characters are to be embossed, and means to prevent effective operation of the numeral-and-code punch and die sets when said carriage is in such another line position.

2. In an embossing machine wherein selectable punch and die sets are arranged at assigned positions in a punch and die member, and wherein an embossable plate or the like is to be presented to a selected punch and die set in embossing position by a carriage adapted to undergo line spacing movements: first punch and die sets allocated to and configured for the embossing of numeral characters and the embossing of associated code representations thereof, said first punch and die sets having certain assigned positions in said member, other punch and die sets occupying other assigned positions in said member and being allocated to and configured for the embossing of other characters, means to enable selected ones of said punch and die sets to be operative on said plate in an embossing operation, shift mechanism for shifting said member through a predetermined punch and die indexing movement prior to effecting an embossure, and means settable by and at a predetermined line position of said carriage, where said numeral characters and code representations are to be embossed, to prevent effective operation of said shift mechanism and being disabled when said carriage is at another line position where said other characters are to be embossed.

3. A machine according to claim 2 wherein the first punch and die sets are one-piece elements each bearing a numeral and the code representation thereof.

4. In an embossing machine wherein a punch and die head member is provided with mounting positions spaced

thereabout for receiving punch and die sets, and wherein an embossable plate or the like is to be gripped in a line spaceable carriage to be presented to a selected punch and die set in embossing position: punch and die sets spaced about said member in certain of said positions thereof and allocated to and configured for the embossing of numeral characters and the embossing of associated code representations thereof, other punch and die sets spaced about said member in other positions thereof and allocated to and configured for the embossing of other characters, means to enable selected ones of said punch and die sets to be operative on said plate in an embossing operation, shift mechanism adapted when in the condition of the operative state to enable said member to be effectively indexed from one such position to another prior to the effecting of an embossure, and means to condition the shift mechanism for operative and inoperative states and being under control of said carriage when in a line position where numerals and code representations thereof are to be embossed so as to thereupon place the shift mechanism in one of said states and adapted to place the shift mechanism in the other of said states when the carriage is in another line position.

5. In an embossing machine wherein a punch and die head member is provided with mounting positions spaced thereabout for receiving punch and die sets, and wherein an embossable plate or the like is to be gripped in a line spaceable carriage to be presented to a selected punch and die set in embossing position: punch and die sets spaced about said member in certain of said positions thereof and allocated to and configured for the embossing of numeral characters and the embossing of associated code representations thereof, other punch and die sets spaced about said member in other positions thereof and allocated to and configured for the embossing of other characters, means to enable selected ones of said punch and die sets to be operative on said plate in an embossing operation, and means controlled by said carriage when in a line position where numerals and code representations thereof are not to be embossed to prevent effective operation of the punch and die sets allocated to said numerals and the code representations thereof.

6. In an embossing machine wherein a punch and die head member is provided with mounting positions spaced thereabout for receiving punch and die sets, and wherein an embossable plate or the like is to be gripped in a line spaceable carriage to be presented to a selected punch and die set in embossing position: punch and die sets spaced about said member in certain of said positions thereof and allocated to and configured for the embossing of numeral characters and the embossing of associated code representations thereof, other punch and die sets spaced about said member in other positions thereof and allocated to and configured for the embossing of other characters, means to enable selected ones of said punch and die sets to be operative on said plate in an embossing operation, shift mechanism adapted when in the condition of an operative state to enable said member to be effectively indexed from one such position to the immediately next position prior to the effecting of an embossure, means to condition the shift mechanism for operative and inoperative states and being under control of said carriage when in a line position where numerals and code representations thereof are to be embossed so as to thereupon place the shift mechanism in one of said states and adapted to place the shift mechanism in the other of said states when the carriage is in another line position, and means under control of said carriage in its other line position to prevent effective operation of the numeral-and-code punch and die sets.

7. An embossing machine wherein numerals are to be embossed along with code representations thereof, and comprising a punch and die member having spaced punch and die sets including numeral-and-code punch and die sets each bearing a numeral and a code representation

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thereof, said code representations each including at least one single element form spaced from and centered with respect to the longitudinal axis of the associated numeral, other punch and die sets for embossing other characters including alphabet characters and distributed among the first-named punch and die sets, a carriage adapted to hold and present a plate or the like to be embossed to the punch and die sets in an embossing relation, means to enable said carriage to undergo line spacing movement so that numeral characters and code representations thereof can be exclusively embossed in a row at a predetermined line location on said plate whilst the other characters can be exclusively embossed in a row at another line location on said plate, and means under control of said carriage to prevent selection of the numeral-and-code punch and die sets when the carriage presents the plate in said other line location.

8. A machine according to claim 7 wherein the punch and die member is arranged for shift spacing, shift mechanism for indexing said member from a non-shift to a shift position; said numeral-and-code punch and die sets being restricted to one of said positions, and means under control of said carriage to render said shift mechanism effective in only one of said line locations of the carriage.

9. In an embossing machine wherein selectable punch and die sets are arranged at assigned positions in a punch and die member, and wherein an embossable plate or the like is to be presented to a selected punch and die set in embossing position by a carriage which is adapted to undergo line spacing movement, means to select said punch and die sets for operation on said plate, shift mechanism for shifting said member through a predetermined punch and die indexing movement prior to effecting an embossure, and means settable by and at a predetermined line position of said carriage to prevent effective operation of said shift mechanism and being disabled when said carriage is at another line position.

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10. In an embossing machine wherein selectable punch and die sets are arranged at assigned positions in a rotatable punch and die member, and wherein an embossable plate or the like is to be presented to a selected punch and die set in embossing position by a carriage which is adapted to undergo line spacing movement, certain of said punch and die sets being in a first group allocated to and configured for the embossing of numeral characters and the embossing of associated code representations thereof, other of said punch and die sets being in another group inclusive of alphabet characters, means to select said punch and die sets for operation on said plate, shift mechanism for shifting said member through a predetermined punch and die indexing movement prior to effecting an embossure, means settable by and at a predetermined line position of said carriage to prevent effective operation of said shift mechanism and being disabled when said carriage is at another line position, and means to prevent effective operation of one group of the punch and die sets when said carriage is in a predetermined line position.

11. In an embossing machine of the kind described wherein a numeral and a code representation thereof are to be embossed, punch and die sets for effecting such embossure and each such set including a slug bearing a numeral form and a code bar representation thereof, said code bar being of elongated shape and aligned longitudinally with the longitudinal center axis of the numeral counterpart.

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