Nov. 17, 1931. J. R. ATKINSON ET AL 1,832,683

MACHINE FOR MAKING STEREOTYPE PLATES FOR PRINTING FOR THE BLIND

Filed Sept. 3, 1930 4 Sheets-Sheet 1

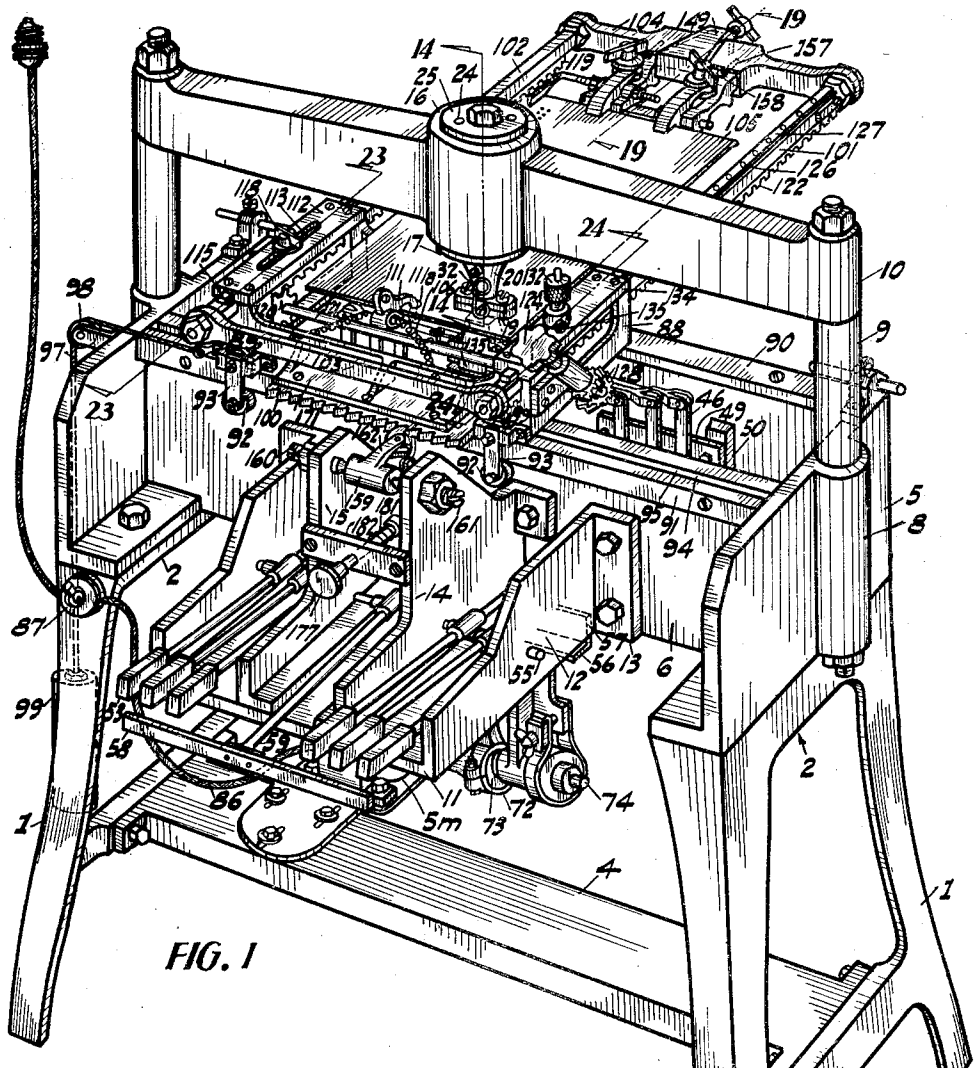


FIG. 1

FIG. 2

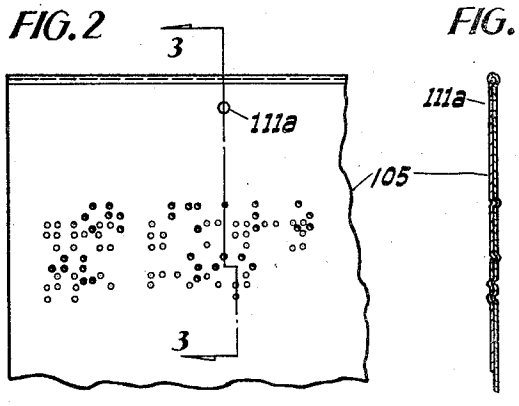


FIG. 3

INVENTORS
JOHN R. ATKINSON
ROBERT GOODELL
JOHN K. STEGE

BY R. R. Barton ATTORNEY

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MACHINE FOR MAKING STEREOTYPE PLATES FOR PRINTING FOR THE BLIND

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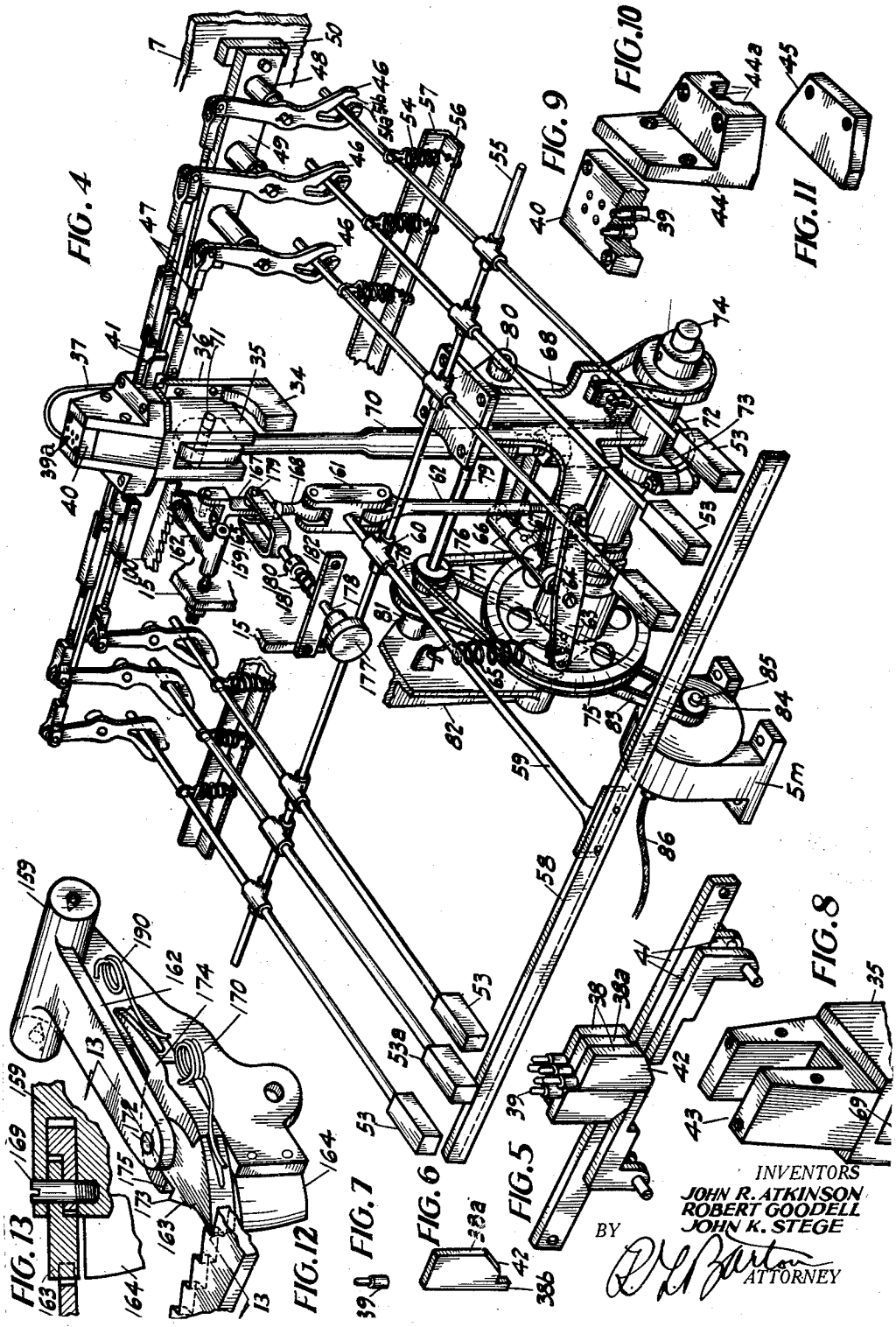


FIG. 4

FIG. 9

FIG. 10

FIG. 11

FIG. 8

FIG. 5

FIG. 6

FIG. 7

FIG. 12

FIG. 13

INVENTORS
JOHN R. ATKINSON
ROBERT GOODELL
JOHN K. STEGE

BY

ATTORNEY

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FIG. 14

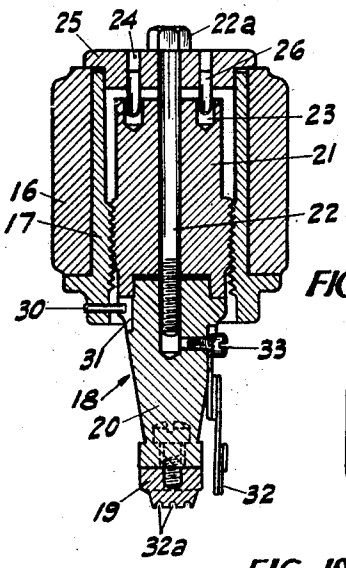


FIG. 15

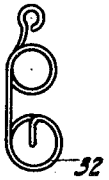


FIG. 17



FIG. 18

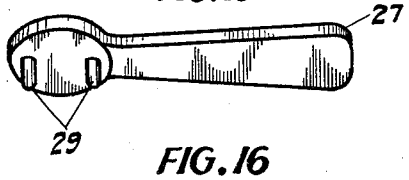


FIG. 16

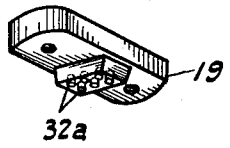


FIG. 19

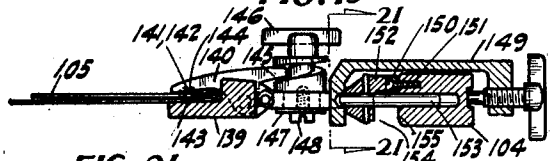


FIG. 20

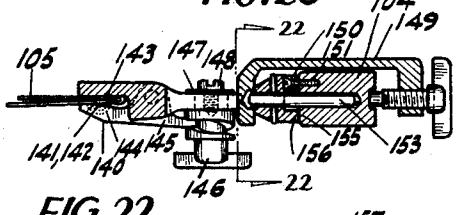


FIG. 21

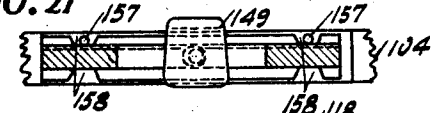


FIG. 22

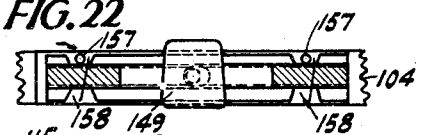


FIG. 23

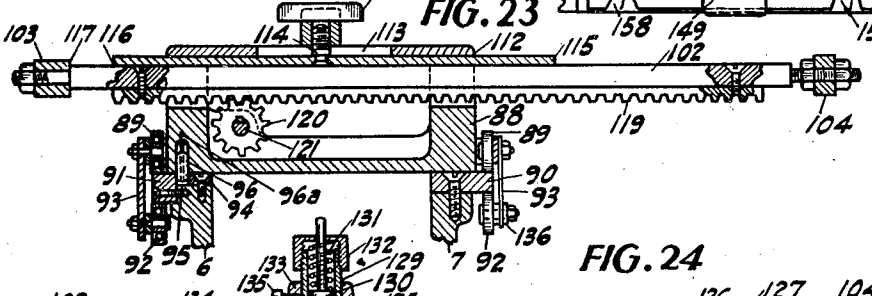
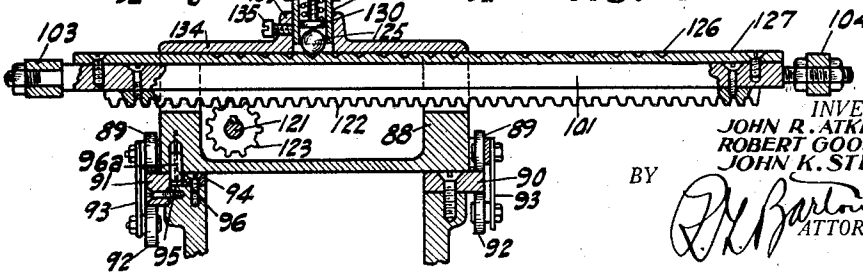


FIG. 24



INVENTORS
JOHN R. ATKINSON
ROBERT GOODELL
JOHN K. STEGE

BY

ATTORNEY

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FIG. 25

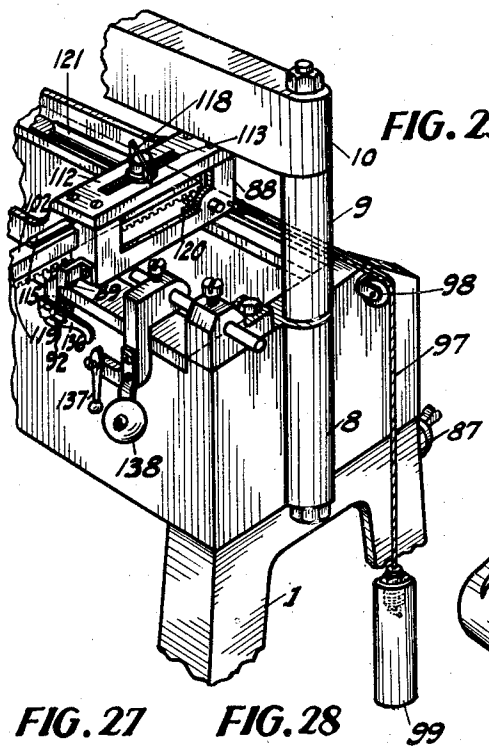


FIG. 26

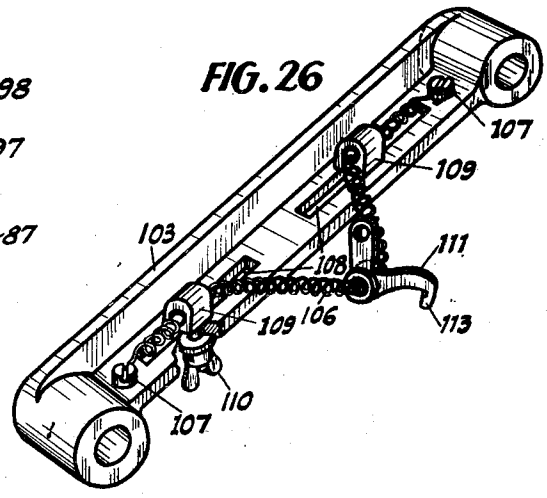


FIG. 27

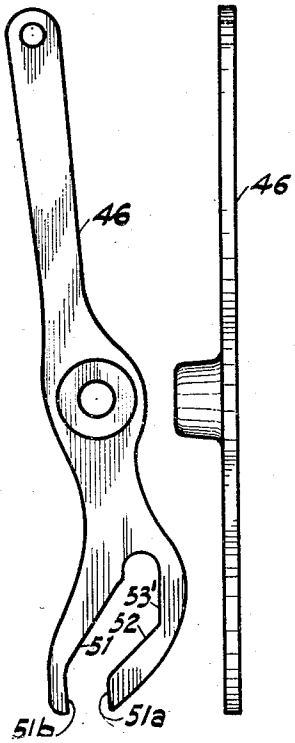
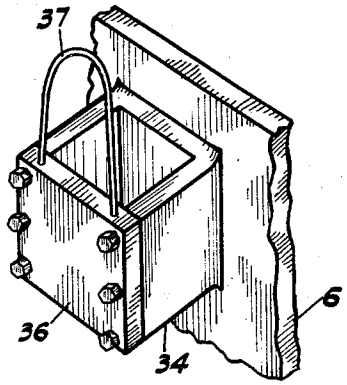


FIG. 28

FIG. 29



INVENTORS
JOHN R. ATKINSON
ROBERT GOODELL
JOHN K. STEGE

BY

ATTORNEY

Patented Nov. 17, 1931

1,832,683

UNITED STATES PATENT OFFICE

JOHN R. ATKINSON AND ROBERT GOODELL, OF LOS ANGELES, AND JOHN K. STEGE, OF HUNTINGTON PARK, CALIFORNIA; SAID GOODELL AND SAID STEGE ASSIGNORS TO SAID ATKINSON

MACHINE FOR MAKING STEREOTYPE PLATES FOR PRINTING FOR THE BLIND

Application filed September 3, 1930. Serial No. 479,444.

The principal object of our invention is to improve in general upon the style and character of the construction embodied in the parental invention machine for making stereotype plates for printing for the blind which resulted in Patent 1,521,415.

Other major objects are to provide a cam lever which is used as a medium through which to operate the styli singly or plurally in the stylus block from the operating key or keys thereby eliminating, or else combining many parts of the original construction, such as bell cranks, rocker levers, and links the combination of which now being reduced makes the machine more simple, efficient, and easy to operate.

Another major object of the present invention is to provide means whereby the styli or die members are constructed individually and interchangeably apart from the die block of which they originally formed a part. This item of improvement alone greatly reduces the cost of these operating parts the replacement of which formerly, owing to their frailty and peculiarity of design, made these parts quite expensive.

Another major object of this invention is the incorporation of an improved clutch mechanism, the subject matter of which, however, is made a basis for a separate patent application.

Another major object of this invention is in the provision of an improved sheet metal plate tension holder whereby the tension of the holder may be varied to prevent sagging of the sheet metal plate while being held in a flat position during the process of embossing.

Another major object of this invention is the provision of an improved interchangeable vise for holding the sheet metal plate in a horizontal plane whereby the interpointing or change in letter and line spacing of the embossment is rendered more simple and accurate.

Still another major object of this invention is in the provision of an adjustable matrix block better to enable the regulation of the depth of the lobes forming the embossed character on the plates themselves.

Still other objects and features may hereinafter appear.

A better understanding of the invention may be had from the drawings taken in conjunction with the detailed description following and then more particularly pointed out in the claims, and wherein:—

Fig. 1 is a perspective view of a machine showing our improved attachments in combination therewith.

Fig. 2 is a fragmentary plan view, illustrating the interpointing scheme.

Fig. 3 is a section taken on line 3—3 of Fig. 2.

Fig. 4 is a skeleton view in perspective showing the principal improved working parts of the machine eviscerated from the main supporting frame of the machine.

Fig. 5 is a perspective view of the styli, the cam blocks upon which they ride and the cam rods which function the cam blocks.

Fig. 6 is a perspective view of one of the individual center cam blocks used to manipulate the individual styli vertically.

Fig. 7 is a perspective view of an individual stylus.

Fig. 8 is a fragmentary perspective view of the stylus block.

Fig. 9 is a perspective view of the die block, a portion thereof being broken away to disclose two styli in nested position therewithin.

Fig. 10 is a perspective view of one of the component parts co-operating with the stylus block to form a guide for the cam rods and a side support for the die block.

Fig. 11 is a perspective view of the cam rod rest.

Fig. 12 is a perspective view of the vital portion of the escapement mechanism.

Fig. 13 is a section taken on line 13—13 of Fig. 12.

Fig. 14 is a section taken on line 14—14 of Fig. 1.

Fig. 15 is a right hand elevation of the stripper spring shown in Fig. 14.

Fig. 16 is a perspective view of the matrix block.

Figs. 17 and 18 are perspective views of

a spanner wrench for adjusting the matrix block.

Fig. 19 is a section taken on line 19—19 of Fig. 1.

Fig. 20 is an inverted section taken on line 19—19 of Fig. 1 to illustrate the means of interpointing.

Fig. 21 is a section taken on line 21—21 of Fig. 19.

Fig. 22 is a section taken on line 22—22 of Fig. 20.

Fig. 23 is a section taken on line 23—23 of Fig. 1.

Fig. 24 is a section taken on line 24—24 of Fig. 1.

Fig. 25 is a fragmentary perspective rear view of the main frame and the carriage, the adjustable margin stop, the means for predetermining the stop and means for moving the carriage.

Fig. 26 is a perspective view of the sheet metal plate tension holder.

Fig. 27 is a front elevation of the cam lever.

Fig. 28 is a side elevation of the cam lever; and,

Fig. 29 is a perspective view of the guide wherein the stylus block reciprocates.

The operating parts of the machine are carried by a frame-work consisting of leg structures 1 of like construction and having a top flanged member 2 and intermediate brace member 3. To the brace member 3 is bolted a transverse beam 4, holding the side frames in spaced relation with each other and adapted for supporting an electric motor 5*m*, the base of which is adjustably mounted on said beam.

There is mounted upon the flanged members 2 a supporting frame for the operating parts, said supporting frame having angle shaped side portions 5, one leg of which is bolted to the flanged member 2. Interconnected with said side portions 5 are the two beam members 6 and 7 standing in vertical planes and spaced apart within the angle of said side portions 5.

The beam has mounted upon the front face thereof an outwardly directed bracket shelf 11, said shelf being provided with upturned sides 12 adapted for supporting the operating keys and outturned flanges 13, the latter providing means whereby the shelf is fastened to the beam.

Symmetrically disposed within and supported by said shelf and beam are other supporting members 14 and 15.

The vertical leg of the angle shaped side portion 5 is provided with a side supporting bracket 8 into which is journalled one end of the upright rod 9. The other end of the rod 9 is journalled within the ends of the cross beam 10.

Mounted in said beam 10 in the enlarged portion 16 at the middle thereof is a sleeve 17, a portion of which is internally threaded. A section drawn through the enlarged portion 16 showing the relation of these parts and other parts, the description of which now follows, may be seen by referring to Fig. 14. Within said enlarged portion it will be seen is adjustably mounted the matrix unit 18.

The matrix unit 18 comprises a matrix 19 (Fig. 16), a matrix holder 20 to which the matrix 19 is screwed, a matrix chuck 21, a cap nut 25 whereby the matrix chuck is screwable in the sleeve 17 to adjust the matrix and a clamp bolt 22 for connecting the matrix holder to the matrix chuck and cap nut.

There is a pair of counterbored holes 23 in the matrix chuck which align with a pair of holes 24 extending through the cap nut. Extending into the outer portions of the latter holes and rigidly fastened therewithin are a pair of dowel pins 26, said dowels being adapted to loosely fit within the counterbored holes of the matrix chuck so that as the matrix chuck is elevated or lowered, the pins will ride up and down in the holes of the chuck.

In Figs. 17 and 18 are shown two views of a compound wrench 27 which is used to manually adjust the matrix unit. The recess 28 in the wrench is adapted for application with the hexagon head of the clamping nut 22*a* and on the opposite face containing said recess are pins 29 formed integral therewith which form a spanner wrench and are adapted to be engaged in the recessed holes formed between the top of the dowel pins and the top face of the cap nut.

There also is provided a pin 30 in the sleeve 17, which extends into a guide slot 31 formed in the matrix holder 20, so that as the chuck is adjusted vertically in the sleeve 17 the pin 30 will prevent the matrix holder from rotating, thereby keeping the recesses 32*a* in the matrix in register with the styli soon to be described.

In adjusting the matrix, the clamp bolt is first loosened to free the grip between the cap nut and the portion 16, the threads of the chuck with those of the sleeve, and the matrix holder with the matrix clutch. The wrench 27 is then applied to adjust the chuck within its sleeve and finally the clamp bolt is tightened to bind the unit together.

Alongside of the matrix holder is fastened a stripper spring 32 thereto by means of a screw 33, said stripper spring being adapted to have the lower loop rest upon the plate to be embossed so as to free the plates from the matrix at any time it might happen to bind.

There is a guide receptacle 34 cast to the beam 6, Fig. 29, wherein is reciprocably mounted the cross-head or stylus block 35. A cover plate 36 completes the box-like receptacle or guide and the cover plate is also utilized to support a stripper wire 37 to prevent excessive sagging of the plate.

Fig. 4 outlines more clearly the position of the guide receptacle with reference to the co-functioning parts, and Fig. 8 shows the stylus block dismantled.

The stylus block 35 is mounted directly under the matrix 19. Inwardly mounted on said stylus block 35, are six cam blocks consisting of two outside cam blocks 38 on a side and a center cam block 38*a* provided with a toe 38*b* (Figs. 5, 6 and 8) upon which the individual styli 39 rest; Fig. 7, the styli 39 are movable vertically in the die block 40, Fig. 9, by means of reciprocating cam rods 41, there being a separate rod for each stylus cam block; and each block has a beveled face 42 which has contact with the rods whereby the inward movement of the rods 41 thereagainst elevate the styli.

In Fig. 4 the second operating key from the left 53*a* is shown depressed and the corresponding stylus 39*a* which it operates may be seen projecting through the die block in which the styli are contained.

Three of these reciprocating cam rods 41 are provided on each side of the stylus block and they are operated from the opposite sides of the machine.

The stylus block 35 contains a recess compartment 43 in which the cam blocks 38 are housed, and over the top thereof is screwed the die block 40 with the styli therein. The bracket 44 is then added to each side, it containing guide recesses 44*a* in its bottom, whereby each cam rod is made to operate its individual cam block. The cam rod rest 45 is then screwed to the bottom of the bracket 44 thus completing the assembly of this unit of the mechanism.

The outer ends of the cam rods 41 are each in turn connected to a cam lever 46 through the medium of the adjustable take up rods 47, said levers being pivotally mounted in succession upon stud pins 48 secured to a plate 49, said plate being screwed to a boss 50 on the face of the beam 7.

In Figs. 27 and 28 are shown two views of the cam lever 46. The lower extremity of said lever has two cam surfaces 51 and 52 formed therein upon which the various operating keys 53 contact to cause the take-up rods 47 to operate the cam rods 41 acting upon the bevel edges of the cam blocks whereby to elevate the styli in the die block to impress with a cooperating matrix the lobes in the plate. As the surface 51 is contacted by the stem of the key the styli are elevated through the operation aforestated, and when the surface 52 is contacted by the stem of the key under the action of the spring 54, the styli and cam blocks having been released by the reshifting of the rods on account of the spring tension being unconstrained therein, fall through the action of gravity.

For the purpose of making the machine so that operators who have a different operating tempo and to avoid the operators having to synchronize their tempo with the movement of the eccentric to impress the embossments in the sheet, it has been found expedient to retard or sustain the styli in the elevated position for a slight interval of time.

This effect is obtained by having the stem of the operating lever travel or idle upwardly along the face 53′ while the styli are in an elevated position and thus producing a slight retardment thereof before the yielding action of the springs 54 causes a quick return of the cam rods as the stem of the operating lever plays on the cam surface 51 of the eccentric lever thereby to premit the return of the styli to their normal position.

This retarding effect is augmented by the cam rods travelling a short distance on the bottom straight face of the cam blocks.

The operation of the cam blocks is made more selective by virtue of the fact that the middle cam block is provided with the toe 38*b* and the cam rod which operates it is elevated slightly above those on either side.

The operating keys 53 are rockably mounted upon and fulcrumed to a shaft 55 journaled in the upturned flanges 12 of the bracket shelf 11. There is provided an angle iron 56 fastened to the beam 6 shown in Fig. 1 upon a flange 57 of which the stems of the operating keys 53 normally rest; the other leg 56 being adapted to have fastened thereto the spring 54 which causes the stems of the operating keys to act upon the cam surface 52, whereby the cam rods are reshifted to an inoperative position.

As a consequence of the depressing of each operating key or keys 53, the corresponding cam block and its cooperating stylus will be elevated and retained so, so long as the key remains depressed.

There is also rockably mounted upon and fulcrumed to the shaft 55 a spacer bar 58. The spacer bar is of sufficient length to completely underlie all the operating keys. The spacer bar proper is fulcrumed to the shaft 55 by means of the spacer rod support 59, it running through a fulcrum union 60 rotatively mounted to the shaft 55 and terminating in a link 61. As the operating keys are depressed by virtue of the spacer bar lying therebeneath it in turn is also depressed.

Therefore it will be seen that at each depression of a key or keys the spacer bar will also be depressed and each time this is done the adjustable connecting rod 62 will be elevated rotating the lever 63 mounted to rotate with the shaft 64 against the tension in the spring 65.

The shaft 64 is journaled in bearings 66 and between said bearing and said shaft is mounted a yoke 67 and it is also pinned to the shaft. The bearings 66 are supported by bracket arms fastened to the supporting arm

68 which is in turn fastened to the machine proper.

The stylus block 35 has a slotted lower compartment 69 wherein is mounted one end of the adjustable connecting rod 70 by means of a wrist-pin 71. On the other end of said connecting rod is mounted a collar 72 and in said collar is a disc 73 eccentrically fixed to the shaft 74. The rotary movement of the shaft imparts a reciprocating movement to the stylus block.

Mounted on the shaft 74 is a driving pulley 75, driven by a belt 76 from a smaller pulley 77. Said pulley 77 is made integral with a pulley 78 the two latter pulleys being mounted upon the shaft 79 supported in boss bearings 80 and 81 carried by the arms 68 and 82.

The pulley 78 is driven by a belt 83 from a pulley 84 on the shaft 85 of the motor 5*m*, all of which is clearly shown in Fig. 4. The motor 5*m* (Figs. 1 and 4) is driven by a source of electrical energy connected therewith by means of a cable 86, said cable being connected to an ordinary light socket (not shown) through the medium of the electric switch 87 fastened on the front of the machine. Thus by operating the switch to close the circuit to the motor, the motor is energized to drive the pulley 75.

A clutch mechanism is mounted on the shaft 74 at the pulley 75 which is adapted to be thrown into and out of engagement with said pulley at will. The novelty of this clutch mechanism being considered of patentable moment, which is being made the subject of a separate application and may be seen by referring to our copending application, filed September 3, 1930, Ser. No. 479,443. However, it will be understood that with each depression of a key 53 or the spacer bar 58, said rod 62 is depressed and said clutch is engaged to operate the eccentric, the rod 70 and the stylus block 35.

The carriage for supporting the sheet material to receive the embossment will now be described.

The carriage comprises a frame 88, Fig. 23, which rolls on four ball bearing type trolley wheels 89 mounted on rails 90 and 91, said rails being screwed to the beams 6 and 7 as shown.

Below said rails 90 and 91 are underslung four lower trolley wheels 92 of the ball bearing type which roll on the bottom surface of the rails 90 and 91 to hold the frame 88 in contact with the beams 6 and 7 in such a manner that it may be moved easily, said upper and lower rollers having their axes joined by a spreader plate 93.

The carriage is further sustained in its movement in relation to the beams and the machine proper by the provision of a side track 94 screwed to the beam 6 thus forming a groove 95 in which a roller bearing 96 fastened to the carriage frame 88 by means of a pin 96*a* freely travels. The frame 88 is moved by means of a cable 97, Figs. 1 and 25, attached thereto and travelling over a pulley 98 and provided with a weight 99. The front side member of said carriage frame is provided with a ratchet bar 100, for an escapement which will be hereinafter described.

Movably mounted through the carriage frame 88 forwardly and rearwardly is a supporting frame consisting of right and left members 101 and 102 and front and rear bars 103 and 104.

The rear bar 104 is provided with an improved clamping arrangement which holds the back edge of a sheet of material to be embossed and has an adjustability which provides for the interpointing thereof. This will be described later with particular reference to Figs. 19, 20 and 21 and 22.

The front bar 103, Figs. 1 and 26, is adapted to be bolted to the front ends of the right and left members 101 and 102.

To the bar 103 is applied the improved tensioning means whereby the sheet metal plate 105 is held taut. The tensioning means comprises a spring 106 the ends of which are fastened near the extremities of the bar 103 by means of screws 107. Adjacent to the fixed ends of the springs are provided slots 108 in the bar 103. Movable in said slots are mounted tensioning lugs 109, adapted to be changed to various positions in the slots by wing nuts 110 whereby to vary the tension in the spring as the hook 111 is brought nearer or displaced farther from said bar.

There is a hole 111*a*, Figs. 1 and 2, always provided in the sheet metal plate 105 which may be engaged by the point 113 of the hook 111. After the sheet metal plate is in position to be embossed the tensioning lugs 110 may be adjusted to eliminate any undue sagging of the plate.

The right and left members 101 and 102 will now be described with particular reference to Figs. 23 and 24.

In Fig. 23 is shown one arrangement of an adjustable stopping means which prevents the operator from encroaching too nearly upon the bottom margin of the plate with the embossing. As a means for eliminating this difficulty we have provided in the cover plate 112 of the carriage, a slot 113. Through said slot is extended a stud bolt 114 to which is riveted a tongue 115, the combination of which is slidable in the slot 113 and the end 116 of the tongue 115 when contacting with the face 117 of the bar 103 provides for any selected adjustment of the frame desired. To lock the tongue in position for obtaining the selected adjustment a thumb nut 118 is provided whereby to clamp the tongue 115 to the cover plate 112 of the carriage.

Fig. 23 also shows the manner in which the left hand member 102 is reciprocated. There is fastened to the bottom side of said

member a rack 119 with which a pinion 120 meshes, said pinion being keyed to a shaft 121.

The right hand member 101 is provided with a similar reciprocating arrangement shown in Fig. 24, consisting of a rack 122 screwed to the member 101 having a pinion 123 meshing therewith, said pinion 123 in this instance being also mounted and keyed to the shaft 121 in relation to the other pinion.

The reciprocating motion of members 101 and 102 provides for the spacing of the embossed lines on the plate 105 and is manually done by the operator. At the end of each written line the hand knob 124 shown in Fig. 1 is rotated until the operator feels a snap action caused by the dropping of the steel ball 125 into the counterbored holes 126 on the bar 127 fastened to the member 101. The hand power is transmitted from the hand knob 124 through the pair of bevel gears 128 to the shaft 121, which rotates the pinions 120 and 123 and consequently reciprocates racks 119 and 122.

The flat steel bar 127 is fastened to the top surface of the member 101 and has counterbored holes 126 equally spaced to establish a certain distance between lines. The steel ball 125 is mounted in a guide sleeve 129 and is held in registry with the holes 126 by means of a spring pressed plunger 130 under the action of the spring 131. The spring pressure is governed by adjusting the sleeve nut 132. The sleeve 129 is mounted within a boss 133 in the cover plate 134 and held in place by a set screw 135.

Thus by manually manipulating the knob 124 the frame which carries the sheet of material 105 can be moved forwardly or rearwardly, as desired. The sheet of material 105 to be embossed extends under the matrix and over the stylus block and moves therebetween. In other words, it moves with the carriage and is also movable manually, a line at a time, either forwardly or rearwardly as desired.

Fig. 25 also discloses a portion of the carriage just described the similarity of parts making the view understandable. In this view, however, is shown the carriage at about its extreme position, and the relation of the carriage to the audible bell will be noted. It will further be seen that there is an engaging lever 136 fastened to the axis of the wheel 92 also shown in Fig. 23 just ready to engage with the clapper 137 after the passing over of which will tinkle the bell 138. The mounting for the bell and the clapper is made adjustable as will be well understood from the drawings.

Referring to Figs. 19, 20, 21 and 22 the clamping means supported by the rear bar 104, the manual manipulation of which is varied to accomplish the interpointing, will now be described.

Fig. 19 shows a transverse section on line 19—19 of Fig. 1, through the detachable vise which keeps the sheet metal plates 105 in a stretched condition ready to receive the impressions as shown in Figs. 2 and 3.

These impressions appear to the reader as convex projections or lobes emerging from the sheet, and the machine as shown in Fig. 1 produces these impressions from the bottom side up, viz., the styli are brought to bear on the under side of the plate and force the metal above into the half spherical openings 32*a* of the matrix 19 in a similar manner as is done in forming dies. Since both sides of the sheet shall be made readable, it is important to distribute the two kind of impressions, i. e., concave and convex, into proper interspacing and this in both directions, viz., longitudinally and laterally on the sheets.

Therefore when the sheet is inverted in the machine it will occupy a new and different relative position in regard to the styli. Fig. 19 shows the lateral adjustability and reversibility of the detachable vise.

The sheet metal plate 105 is clamped in the vise 139 by the pivoted jaws 140, thereby creating dual clamping impressions 141 and 142 by means of the protuberance 143 and the cavity 144 and assuring the same location between the vise and sheet when the latter is taken out of the press and inserted again at another time.

The jaw 140 is provided with a finger portion 145 adapted to engage with the worm portion of the thumb screw 145, which is turnably arranged in the vise body 139 and held in engagement therewith by means of the washer 147 and screw 148. The vise body is firmly clamped to the rear bar 104 by a clamp 149 and the contacting of these two parts is made at the surface of the steel ledge 150 and at the surface of the notched face 152 of the vise, said ledge being fastened to the rear bar by flat head screws 151.

A pin 153 firmly held in the vise and rotatably arranged in the rear bar 104 provides for the re-location and detachability of the vise.

When the contacting the vise and rear bar is achieved by the ledge 150, then a space 154 will be existent between these two members as shown, and the sheet metal plate 105 will be slightly nearer to the operator, whereas a re-attachment of the vise in inverted position as shown in Fig. 20, will bring the sheet metal plate 105 slightly further from the operator, the contacting by virtue of the latter operation being made by the surface 155 of the rear bar and the surface 156 of the vise, thereby creating a standardized lateral inter-distance between the concave and the

convex impressions; noticeable in Figs. 2 and 3.

To accomplish a standardized longitudinal spacing differentiation between convex and concave impressions, (see again Fig. 2), the pin 153 in the vise is eccentrically located as shown in Fig. 21, said section being taken on the line 21—21 of Fig. 19, and the sheet metal plate in this case is slightly displaced toward the left of the operator or in relation to the stylus block, whereas an inversion of the vise as shown in Fig. 22 will slightly move the sheet metal plate to the right. The convex and concave impressions therefore will never interfere with each other.

For the purpose of keeping the vise in a horizontal position whether mounted or not, two pins 157 are driven into the rear bar 104 and projecting therefrom sufficiently to engage the bottom surface 158 of the grooves provided in the vise.

Referring now to Figs. 1, 4, and particularly to Figs. 12 and 13, the escapement will now be described.

Mounted between the spaced supporting members 14 and 15 is a pivot swung member 159 supported at its ends by pivot studs 160 and 161 screwed into the supporting members 14 and 15, said pivot swung member 159 being provided with an extension 162 on which is mounted the pawls or dogs whereby the ratchet bar is regulated in its movement step by step or in multiples thereof.

The lower edge of said extension is connected to a link 167, the lower end of which is connected to the toggle pin 179, said toggle pin joining a toggle arrangement consisting of a toggle link 165, and a swivel link 168, the eye of which is pinned to the H-link 61. Said link 61 has fulcrumed thereinto the spacer rod support 59, whereby from each depression of a key, or of the spacer bar, or both said extension 162 is raised and the escapement and clutch mechanism is simultaneously operated.

Mounted in said extension 162 is a dog 163 pivoted to said extension 162 at 172 by a pin 169. There is a spring 170 mounted on the dog stop 174 which limits the rearward movement of the dog 163. Spring 170 is adapted for moving the operating end of said dog 163 forwardly when it is raised out of one notch of the ratchet bar, so that when it is again moved down it will be in the next notch. There is a stationary dog 164 underlying the pivoted dog 163 which cooperates with the pivoted dog 163 in constraining the carriage to move one notch at a time.

This escapement arrangement provides for the mechanical longitudinal movement of the carriage 88 shown in Figs. 1 and 25, for the purpose of feeding the sheet metal plate and the carriage intermittently or step by step from right to left as viewed from the operator in order to stamp the impressions thereon in equal spacings. The power source to move the carriage leftward as hereinbefore stated, is by the weight 99, connected to the carriage by the cable 97.

After each line is finished on the plate, the operator moves the carriage from left to right by hand power, as is done similarly on typewriting machines, thereby pulling the weight 99 to a higher elevation and ready to descend when the escapement member 159 again performs its oscillation up and then down.

The front part of the carriage is formed into a shelf-like ledge 171 to which at the bottom side is fastened the ratchet bar 100 which meshes with the teeth of the dog 163 and the stationary dog 164 as afore described.

When a key, for example 53*a*, (Fig. 4) is depressed sufficiently motion is imparted to the bar 58, lever 59, H-link 61, swivel link 168 and link 167 thereby raising the extension 162 to its uppermost position. The carriage cannot move during this cycle of operation because the stationary dog 164 is rigidly fastened to the member 159; but when a key (for example 53*a*) is allowed to move up again or assume its normal position, the extension 162 of member 159 consequently moves down, and it carries with it the dog 163. The ratchet bar is then advanced one space by the weight 99, it overcoming the resistance of the spring 170. Thus the carriage is mechanically operated by depressing the keys, spacer bar or both.

The dog will pass over one tooth step by step each time the extension is elevated, and when it is lowered the weight 99 will move the ratchet bar one space, the stationary dog holding the ratchet bar against the action of the weight during the time the dog 163 is being moved by the action of the spring 170. The space between the contacting faces 173 and 175 represents the distance the dog has to travel or the pitch distance between teeth. Thus the alternate engagement of the ratchet bar teeth with the dogs accomplishes a movement limited to the pitch of the ratchet bar teeth.

When the longitudinal distance between the impressions necessitates a greater spacing than what is provided for, then a manual pulling operation of the release knob 177 on the stem 178 will result in the depressing of the spring 181 seated between the spring seat 182 and the collar 180 acting upon the toggle link 165 to collapse the otherwise straight alignment of the swivel link 168 and link 167 thereby depressing the extension of the member 159 to permit of an escapement motion greater than the pitch distance of the ratchet teeth. In order to accomplish the latter movement manually say for approximately the entire width of the plate, the knob 177 is pulled, the ratchet

bar with the carriage is moved bringing the two faces 173 and 175 in contact with one another.

At this juncture the ratchet teeth cannot pass free of the operating tip of the dog. It will then be necessary to manually exert a greater pressure of the face 173 against the face 175 thereby operating against the opposition of the spring 190. After the latter operation the ratchet bar teeth will free the top of the operating dog and the carriage can be shifted where and as desired.

The arrangement and operation of the parts just described releases the carriage so that a quick reshifting action of the carriage may be obtained.

The clutch is not cut in by the latter operation but only the escapement.

Referring again to Figs. 4, 5 and 27, it is desired to point out that in Fig. 4 the stem ends of the operating rods are shown slightly in advance of their normal resting position with the exception of key 53*a* to show the two jaw portions 51*a* and 51*b*, Fig. 27, between which the stem of the operating key reclines when in normal and inoperative position and against the face of the jaw 51*a* which is utilized as a lock to prevent an adjacent cam rod from being advanced and a stylus elevated as a consequence of one cam rod face rubbing against another or from the quick manipulation of the keys by the operator wherein the use of one cam rod may be insufficiently delayed before its adjacent cam rod is put into use.

The face 51*a* acts as a positive lock for holding the eccentric lever against lateral movement. In this manner the styli other than those positively elevated by a key will be constrained from indenting the sheet metal plate when the stylus block is actuated.

From the foregoing it will be manifest we have greatly improved upon the style and character of the mechanism of which the original machine was composed.

This reorganization or new relation of parts will now be defined in the claims.

Claims:

1. In an improved machine of the class described, a stylus block, movable cam blocks mounted in said stylus block, a die block carried by said stylus block, styli contained in said die block, keys with connections for moving said cam blocks, whereby to actuate said styli, power actuated means for moving said stylus block and styli as a unit, and means operable by the movement of said keys for setting said power means into action whereby to move said stylus block with each depression of a key.

2. In an improved machine of the class described, a stylus block, movable cam blocks mounted in said stylus block, a die block carried by said stylus block having styli individually and selectively operable contained therein, a cam rod in engagement with a bevel surface of said cam block, a cam lever, means connecting said cam rod and said eccentric, and an operating key operatively related to said eccentric lever the manual manipulation of which operates said styli.

3. In an improved machine of the class described, the combination with means for supporting a sheet of material to be embossed, a movably mounted stylus block, cam blocks, therein, a die block mounted in said stylus block having styli grouped therewithin operable by the movement of said cam blocks, cam rods adapted to move said cam blocks, an oscillative cam lever, pivoted means connecting said cam rods and said cam lever, a key in loose engagement with said cam lever the manual manipulation of which elevates said styli, an adjustable matrix above said stylus block, means operatively related to said key for automatically controlling the movement of said stylus block and styli, and power means adapted to be put into operative connection with said stylus block by manipulating said key for operating the stylus block whereby to emboss the sheet.

4. In an improved machine of the class described, in combination with means for supporting at one end a sheet of material to be embossed, of a movably mounted stylus block, cam blocks therein, a die block mounted in said stylus block having styli grouped therewithin operable by the movement of said cam blocks, cam rods operatively related to said cam blocks, an oscillative cam lever, pivoted means connecting said cam rods and said cam lever, an operating key the stem of which is in loose engagement with the cam face of said cam lever, the manual manipulation of which actuates one of said styli, an adjustable matrix above said stylus block, means operatively related to said key for automatically controlling the movement of said stylus block and styli, and power means adapted to be put intermittently into operative connection with said stylus block by manipulating said key for operating the stylus block.

5. In an improved machine of the class described, in combination with means for supporting at one end a sheet of material to be embossed, a movably mounted stylus block, cam blocks therein, a die block mounted in said stylus block having styli grouped therewithin operable by the movement of said cam blocks, cam rods adapted to move said cam blocks, an oscillative cam lever having two cam surfaces, pivoted means connecting said cam rods and said cam lever, a pivotal support for said cam lever, an operating key the stem of which is in loose contact with one of the cam faces of said cam lever when the cam rod is shifted to elevate the styli and in loose contact with the other of said cam faces

when the cam rod is reshifted to permit the styli to return to their normal position, the latter action of the key with the cam surface producing a quick return motion of said cam rods, said operating key being manually operable whereby to actuate said styli through the medium of said cam lever, an adjustable matrix, means operatively related to said key for automatically controlling the movement of said stylus block and styli, and power means adapted to be put intermittently into operative connection with said stylus block by manipulating said key for operating the stylus block.

6. In an improved machine of the class described, in combination with means for supporting at one end a sheet of material to be embossed, a movably mounted stylus block, cam blocks therein, a die block mounted in said stylus block having styli grouped therewithin operable by the movement of said cam blocks, cam rods adapted to move said cam blocks, an oscillative cam lever having two cam surfaces, pivoted means connecting said cam rods and said cam lever, a pivotal support for said cam lever, an operating key the stem of which is in loose contact with one of the cam faces of said cam lever when the cam rod is shifted to elevate the styli and in loose contact with the other of said cam faces when the cam rod is reshifted to permit the styli to return to their normal position, the latter action of the key with the cam surface producing a quick return motion of said cam rods, means to produce a slight retardation of the movement of the styli between the time when they are elevated and when they begin to return to their normal position, said operating key being manually operable whereby to actuate said styli through the medium of said cam lever, an adjustable matrix, means operatively related to said key for automatically controlling the movement of said stylus block and styli, and power means adapted to be put intermittently into operative connection with said stylus block by manipulating said key for operating the stylus block.

7. In an improved machine of the class described, in combination with means for supporting at one end a sheet of material to be embossed, a movably mounted stylus block, cam blocks therein, a die block mounted in said stylus block having styli grouped therewithin operable by the movement of said cam blocks, cam rods adapted to move said cam blocks, an oscillative cam lever having two cam surfaces, pivoted means connecting said cam rods and said cam lever, a pivotal support for said cam lever, an operating key the stem of which is in loose contact with one of the cam faces of said cam lever when the cam rod is shifted to elevate the styli and in loose contact with the other of said cam faces when the cam rod is reshifted to permit the styli to return to their normal position, the latter action of the key with the cam surface producing a quick return motion of said cam rods, the movement of the operating lever from the time of its contact with one cam surface to its contact with the other cam surface producing a slight retardation of the movement of the styli between the time when they are elevated and when they begin to return to their normal position, said operating key being manually operable whereby to actuate said styli through the medium of said cam lever, an adjustable matrix, means operatively related to said key for automatically controlling the movement of said stylus block and styli, and power means adapted to be put intermittently into operative connection with said stylus block by manipulating said key for operating the stylus block.

JOHN R. ATKINSON.
ROBERT GOODELL.
JOHN K. STEGE.