Nov. 3, 1925. 1,560,209

C. CHISHOLM

EMBOSSING MACHINE

Filed May 14, 1923 8 Sheets-Sheet 1

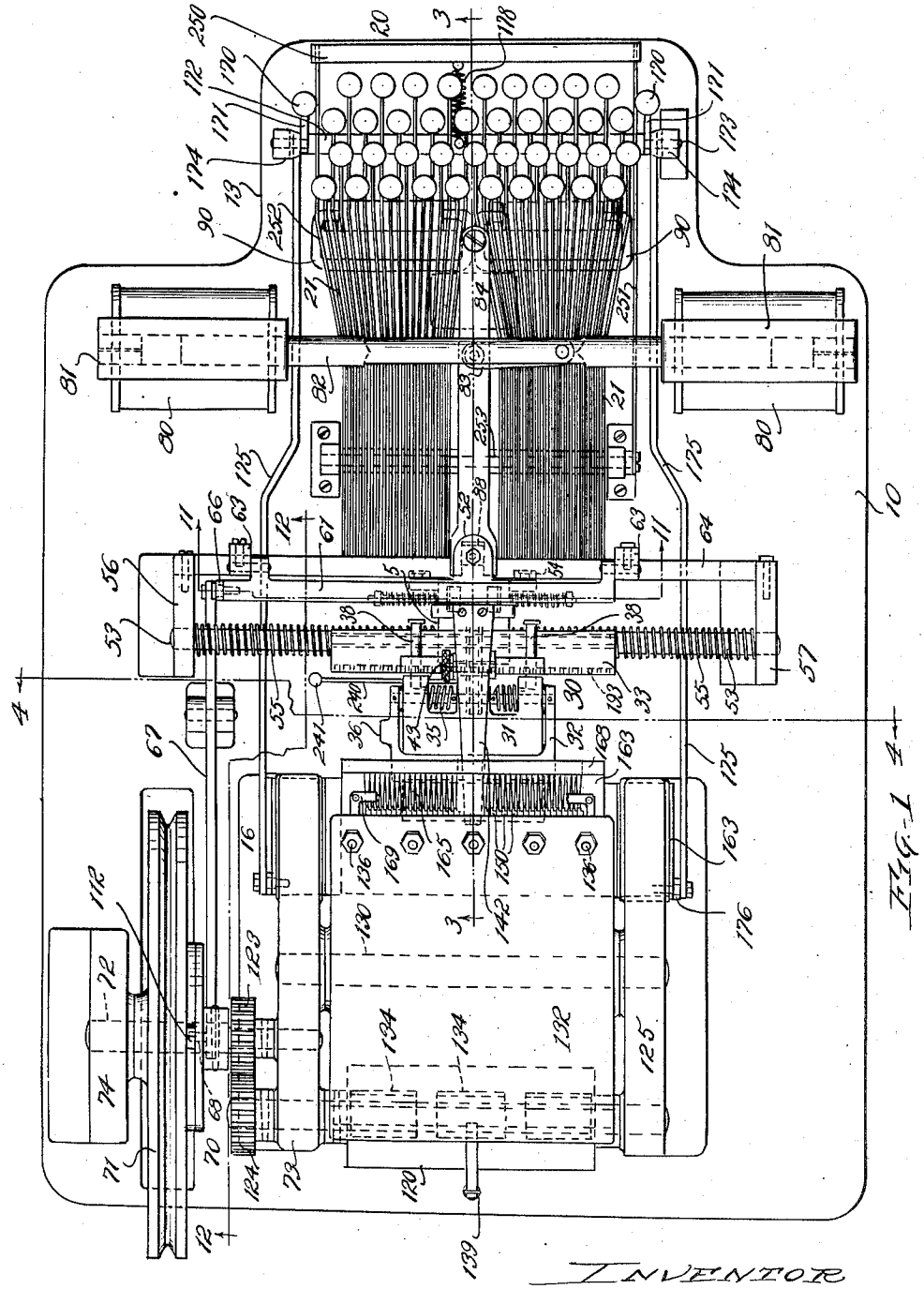


Fig. 1

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Nov. 3, 1925. 1,560,209

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EMBOSSING MACHINE

Filed May 14, 1923 8 Sheets-Sheet 2

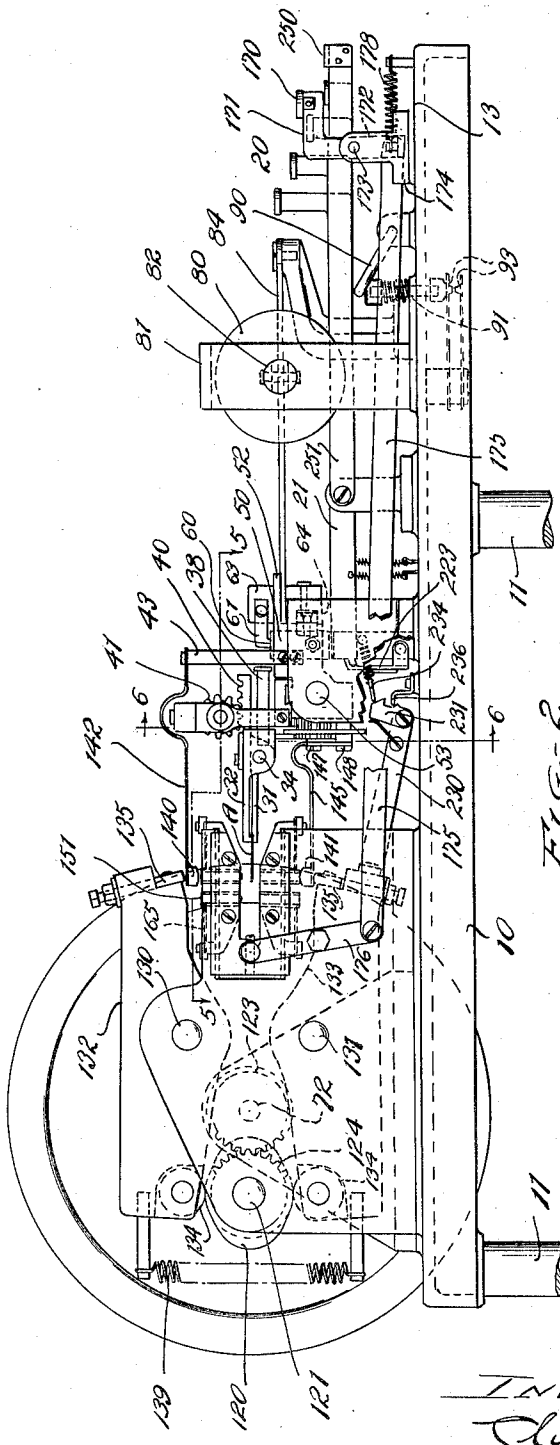


FIG. 2

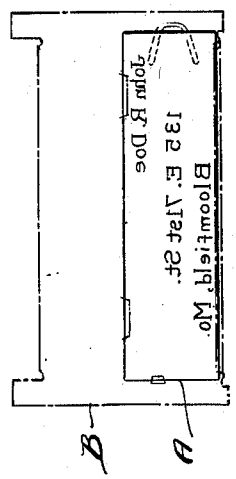


FIG. 17

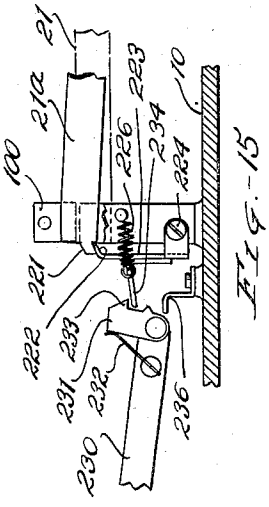


FIG. 15

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C. CHISHOLM

EMBOSSING MACHINE

Filed May 14, 1923 8 Sheets-Sheet 3

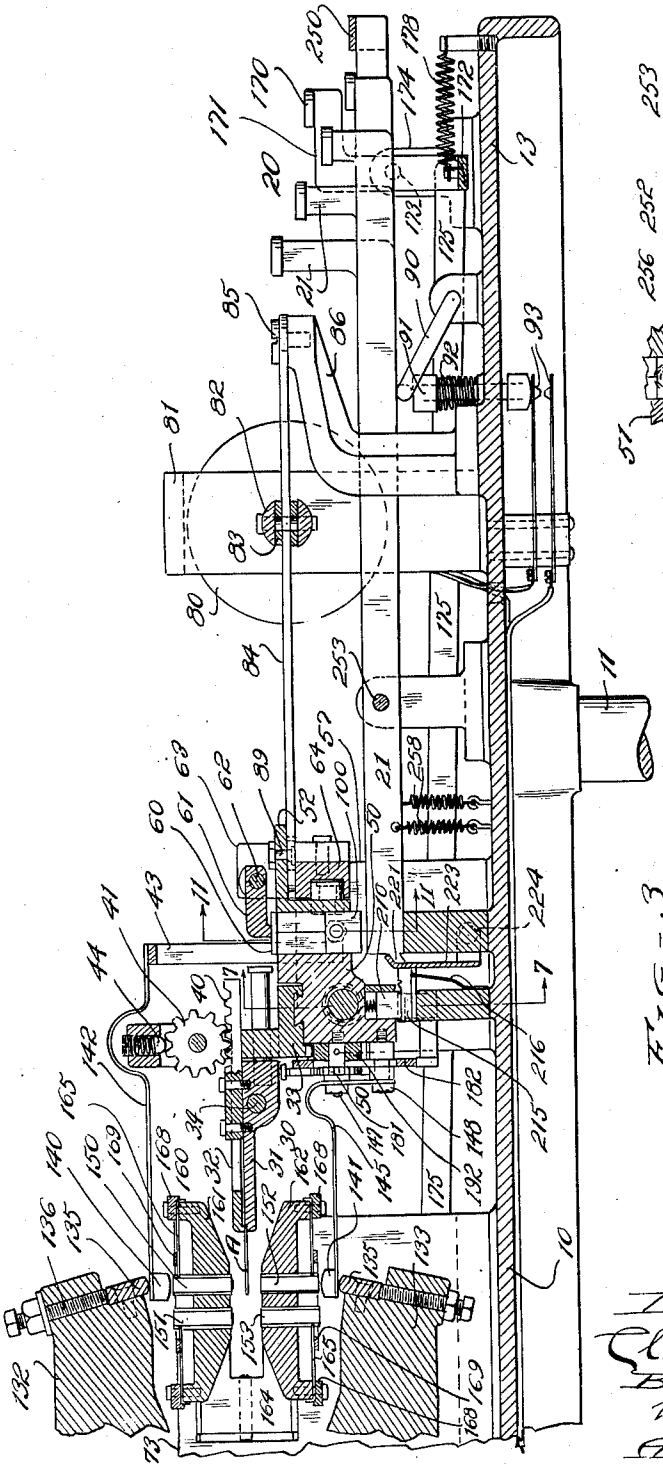


FIG. 3

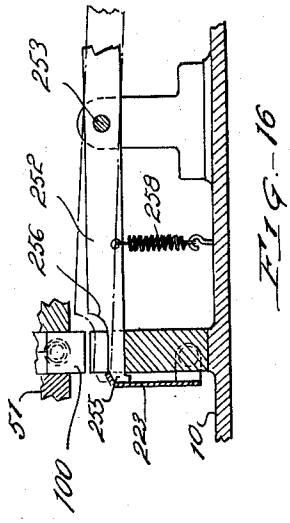


FIG. 16

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Nov. 3, 1925. 1,560,209

C. CHISHOLM

EMBOSSING MACHINE

Filed May 14, 1923 8 Sheets-Sheet 4

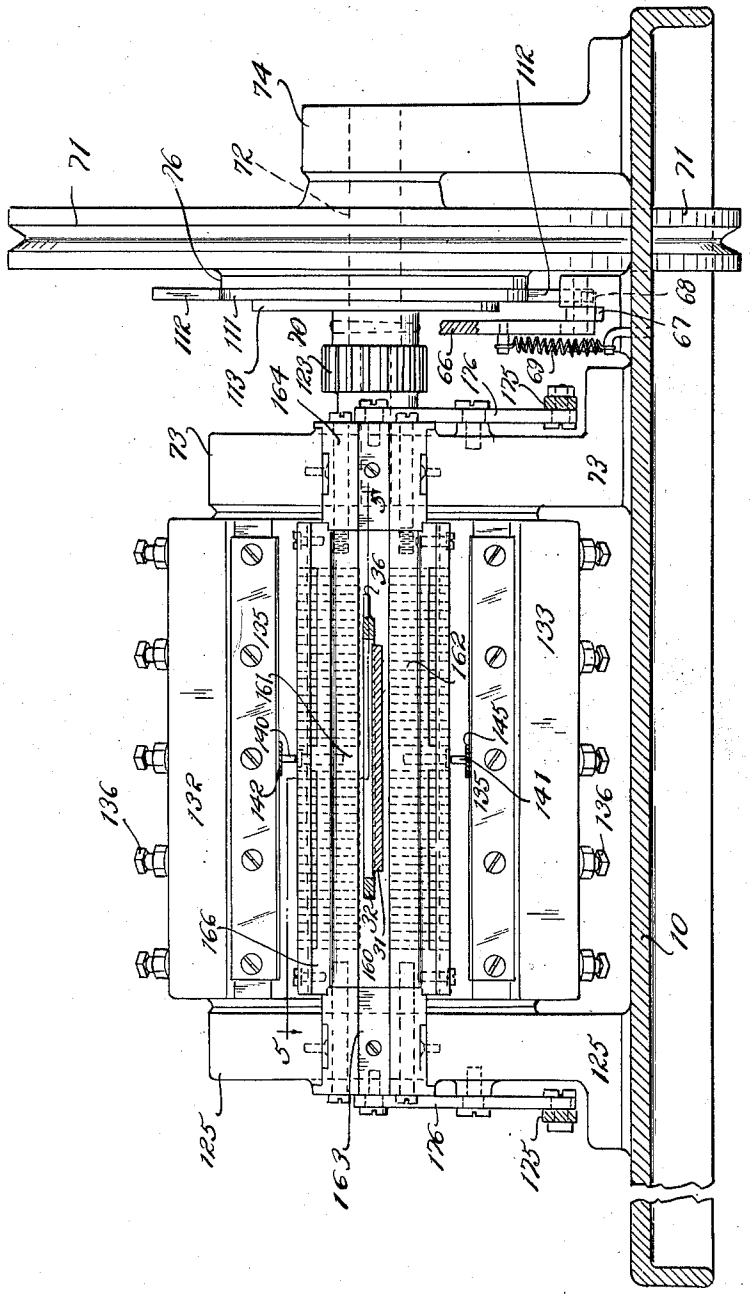


Fig. 4

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C. CHISHOLM

EMBOSSING MACHINE

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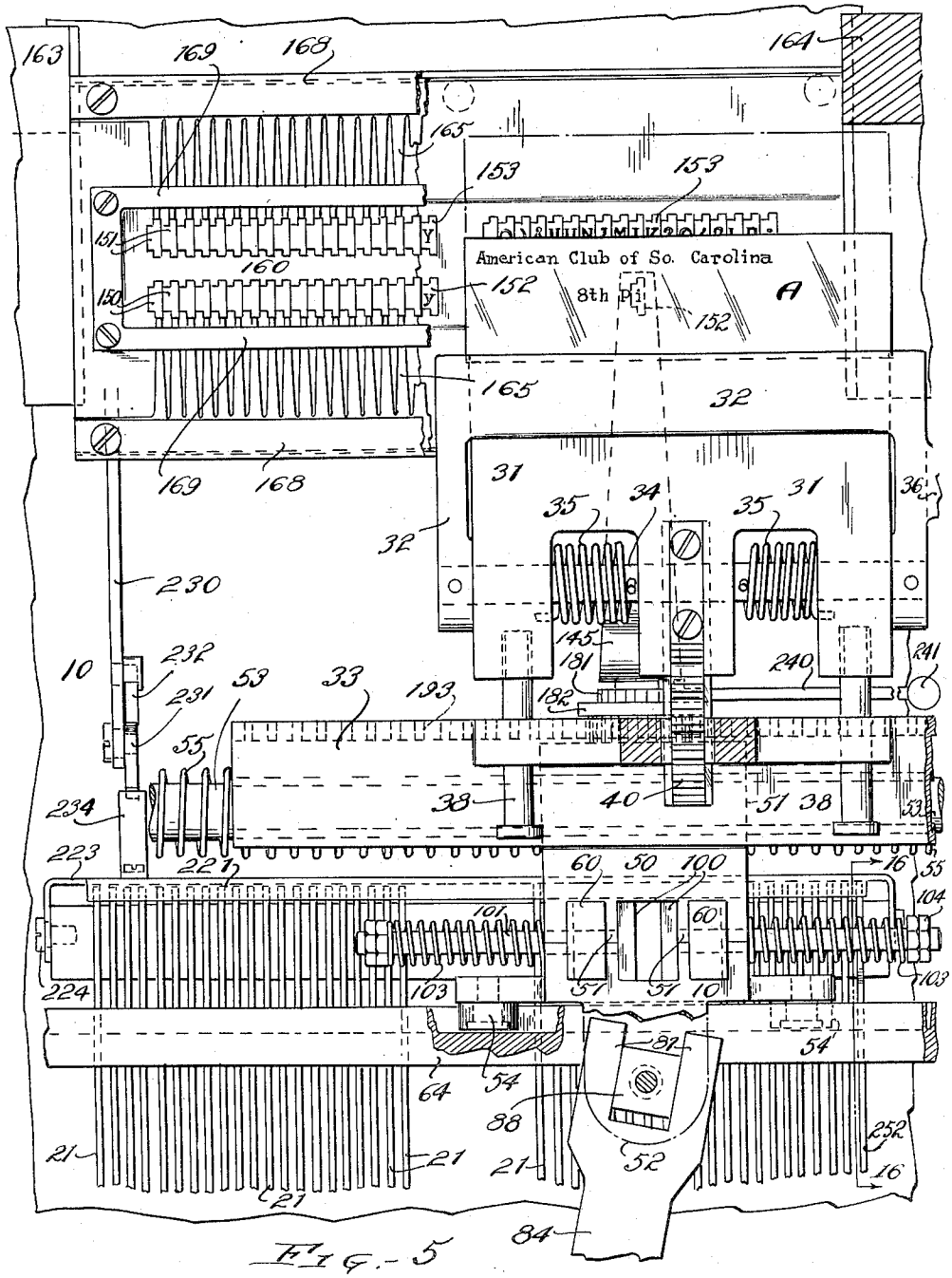


FIG. 5

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EMBOSSING MACHINE

Filed May 14, 1923 8 Sheets-Sheet 6

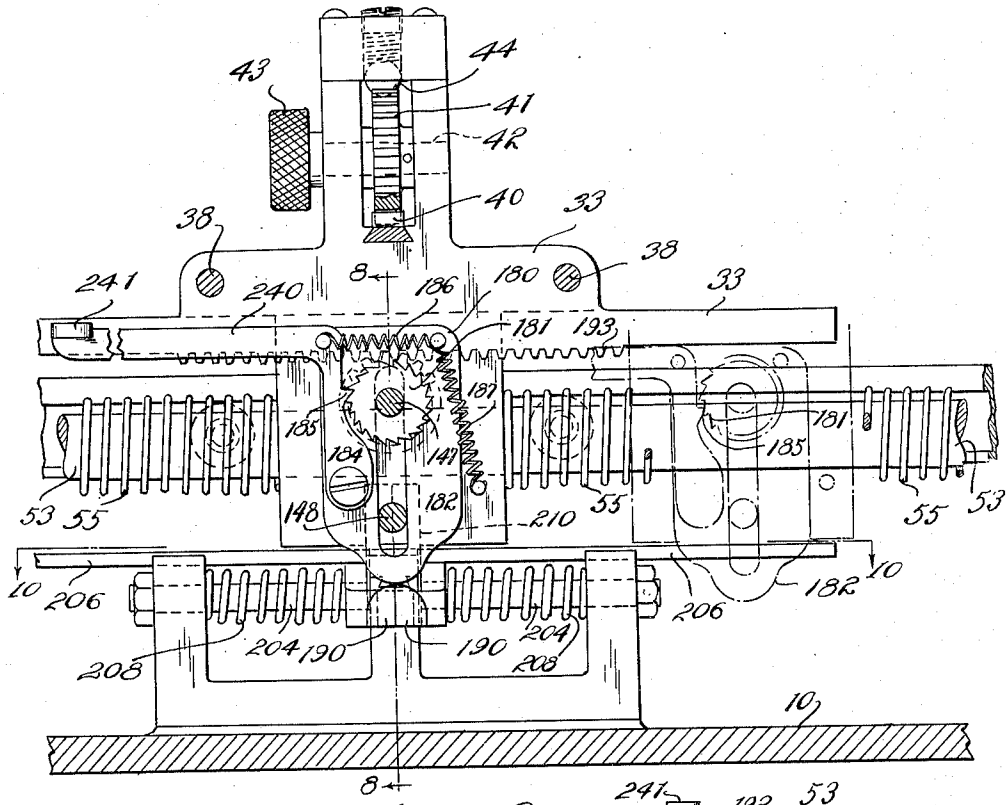


FIG.-6

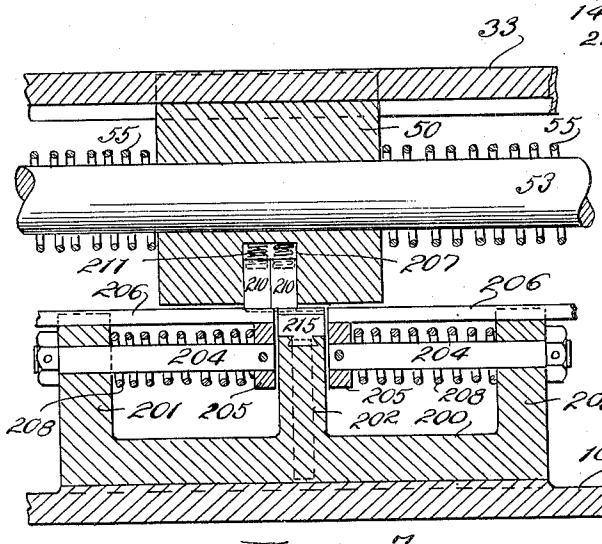


FIG.-7

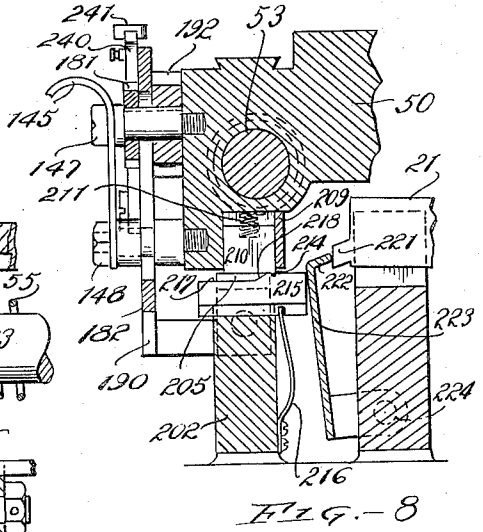


FIG.-8

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1,560,209

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EMBOSSING MACHINE

Filed May 14, 1923

8 Sheets-Sheet 7

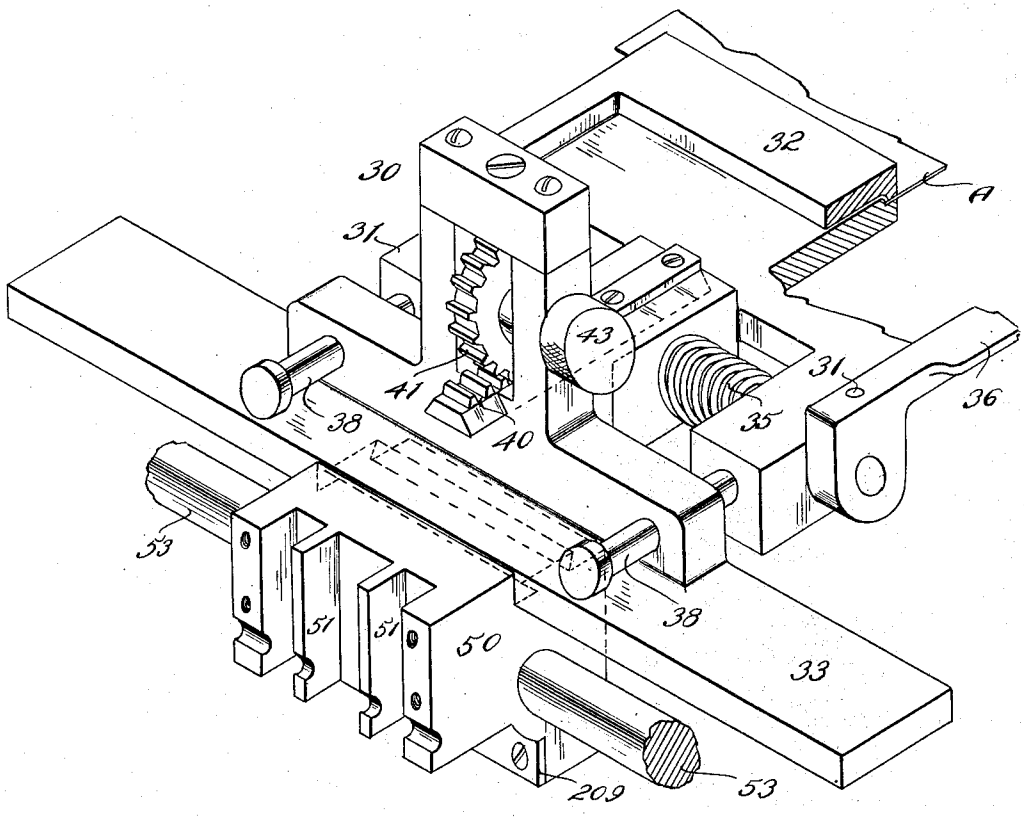


FIG.-9

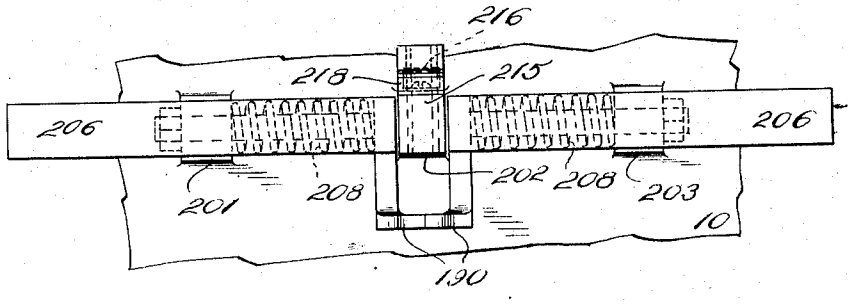


FIG.-10

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C. CHISHOLM

EMBOSSING MACHINE

Filed May 14, 1923 8 Sheets-Sheet 8

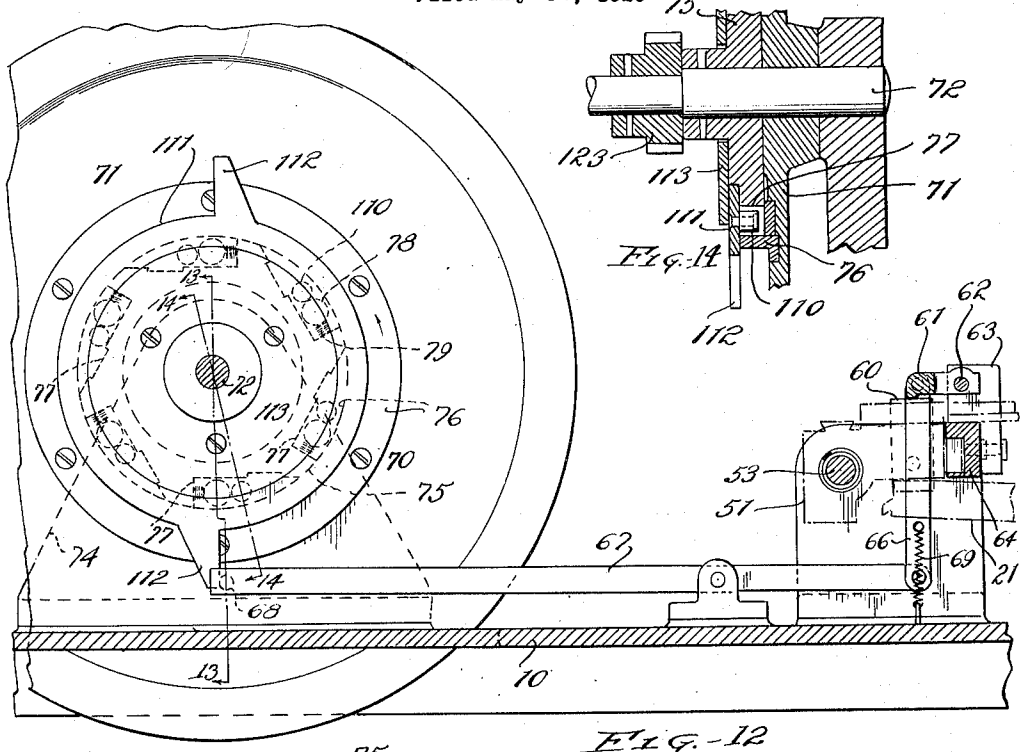


FIG.-12

FIG.-14

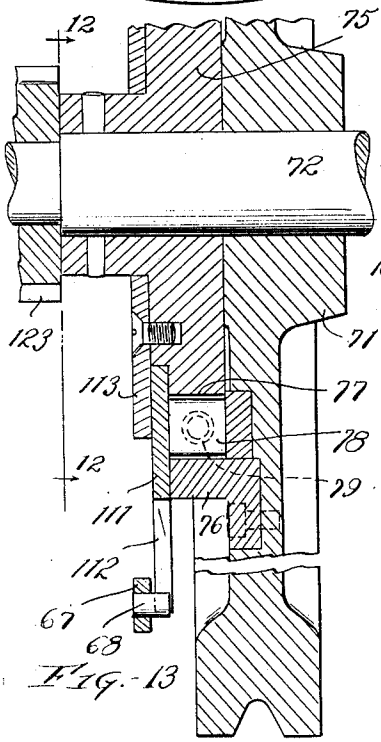


FIG.-13

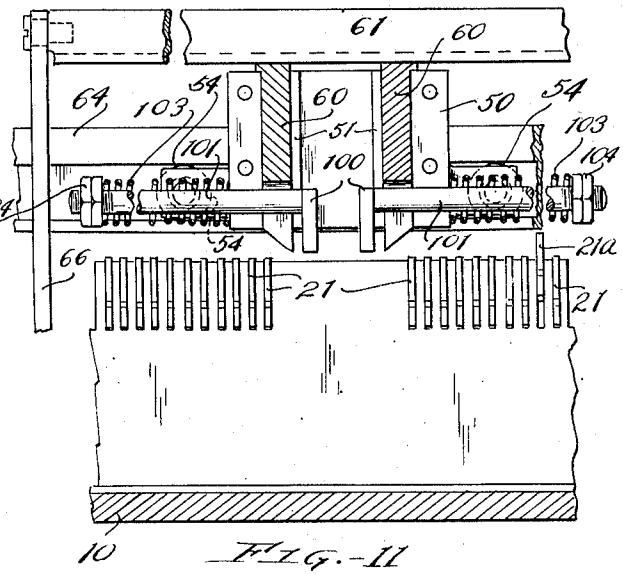


FIG.-11

INVENTOR
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ATTORNEYS

Patented Nov. 3, 1925. 1,560,209

UNITED STATES PATENT OFFICE.

CLIFTON CHISHOLM, OF CLEVELAND, OHIO, ASSIGNOR TO THE AMERICAN MULTIGRAPH COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

EMBOSSING MACHINE.

Application filed May 14, 1923. Serial No. 638,717.

To all whom it may concern:

Be it known that I, CLIFTON CHISHOLM, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Embossing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to a keyboard-controlled machine for embossing printing characters on a suitable plate, the object being to provide an efficient mechanism of this character which may be rapidly operated and in which the various operations will follow automatically consequent upon the actuation of a key corresponding to the character to be embossed.

The invention includes a reciprocable carrier adapted to carry the plate to be embossed and operable to a position between opposed male and female dies which correspond to the key which causes the positioning of the plate. The embossing operation follows automatically consequent upon such positioning. In its preferred form the die holder has two rows each of male and female dies, one for upper case and the other for lower case type, and suitable shift mechanism is provided for shifting this die holder to bring either set into position for actuation by the embossing mechanism.

Many of the mechanisms of the present application are similar to those shown in my prior application, No. 535,311, filed February 9, 1922, for an embossing machine, where the die carrier travels consequent upon the actuation of a key to effect embossing on a continuous strip of metal which is progressed a character space at a time, but is not variably shifted according to the key actuated. Reference is therefore made to that application for claims covering a number of features of the present machine.

The present machine is hereinafter more fully described in connection with the drawings illustrating a preferred embodiment thereof and the essential novel features are summarized in the claims.

In the drawings, Fig. 1 is a plan of the complete machine; Fig. 2 is a side elevation thereof; Fig. 3 is a vertical central section as indicated by the section line 3—3 in Fig. 1, and looking in the same direction as Fig. 2; Fig. 4 is a vertical transverse section in front of the dies as indicated by the line 4—4 on Fig. 1; Fig. 5 is a sectional plan above the dies and the carriage, as indicated by the offset lines 5—5 in Figs. 2 and 4; Fig. 6 is a vertical transverse section on the line 6—6 of Fig. 2, looking toward the front of the machine and illustrating the mechanism for periodically spacing the plate holding carriage; Fig. 7 is a vertical transverse section parallel with Fig. 6 and in front thereof as indicated by the line 7—7 on Fig. 3, showing parts of the mechanism for locking the plate carriage in its central position; Fig. 8 is a detail of the plate locking mechanism, being a vertical section on the line 8—8 of Fig. 6; Fig. 9 is a perspective of the plate carriage; Fig. 10 is a detail in plan of the carriage stop mechanism, looking down from the plane, indicated by the line 10—10 on Fig. 6; Fig. 11 is a vertical transverse section on the plane indicated by the line 11—11 on Fig. 3, showing the carriage stop and clutch initiating mechanism; Fig. 12 is a sectional side elevation of the clutch mechanism, as indicated by the lines 12—12 of Fig. 1 and also on Fig. 13; Fig. 13 is an enlarged detail of the clutch, being a transverse section as indicated by the line 13—13 on Fig. 12; Fig. 14 is a sectional detail of the clutch on the plane indicated by the line 14—14 on Fig. 12; Fig. 15 (Sheet 2) is a detail of a trip mechanism to release the key consequent upon the completion of the embossing operation; Fig. 16 (Sheet 3) is a detail of the rear end of the spacing key lever, being a section on the line 16—16 on Fig. 5; Fig. 17 (Sheet 2) is a view of an embossing plate such as may be made by this machine, this view illustrating also in broken lines a suitable holder for such plate.

The frame of my machine is shown as consisting primarily of a horizontal bed plate 10 mounted on suitable legs 11. Numerous standards or brackets are mounted on this bed plate as will be described hereinafter in connection with the particular mechanisms they carry.

Referring briefly to the general arrangement of the more important mechanisms of the machine, the keyboard 20 in Fig. 1 is

located at the front of the machine above an extension 13 of the bed plate, this keyboard consisting of suitable finger pieces and rearwardly extending levers 21 pivoted on a rod 253, as hereinafter described. At the rear of the key levers is the reciprocating plate carriage 30, mounted to move laterally in either direction from a central position and adapted to carry a plate A which travels between a set of male and female dies mounted on a suitable die carrier 160. On opposite sides of the key levers are two solenoid magnets 80 which operate suitable mechanism to shift the plate carriage from its central position of rest toward the side where the magnet is located. The actuation of the key levers energizes one or the other of the solenoid magnets to shift the plate carrier and the raised rear end of the key lever serves as a stop for the plate carrier, whereby it is caused to assume the position between dies which corresponds to the character key depressed.

As the plate carriage comes to rest, one or the other of the cam faced plungers 60 (Figs. 3 and 11) is raised by the raised rear end of the key lever and this raises a universal bar which through suitable mechanism releases the clutch 70 (Fig. 12) which makes a half rotation and in doing so gives a half rotation to the cam 120 (Fig. 2) which operates levers 132 and 133 carrying plunger plates 135 which operate on distance blocks 140 and 141 between the plunger plates and dies and carried laterally with the plate carriers. Accordingly, the pair of dies corresponding to the key depressed are caused to be moved toward each other to emboss the plate.

Following the embossing operation, a suitable ratchet mechanism designated generally 180, illustrated in Fig. 6, gives the plate carriage a movement toward the operator's left an amount corresponding to one character space, as the carriage returns to its central position of rest, so that the next embossing action will take place one character space at the right of the character embossed.

The keyboard is preferably of the shift key type wherein each key corresponds to a plurality of characters. This is arranged in the present machine by having two sets of male dies and two sets of corresponding female dies, each class mounted one set behind the other in the die carrier, which is arranged to be shiftable in a fore and aft direction to bring either set into range of the plunger actuated mechanism. Suitable mechanisms are provided to lock a depressed key down until the completion of the embossing operation and then to release it. Mechanism is also provided to back space the carriage, enabling correction in case improper keys are struck. These and numerous other details will be explained hereinafter.

Referring now to Figs. 1, 2, 3, 5 and 8, the plate A is carried by a pair of jaws 31 and 32 of the plate carriage 30. The jaw 31 is a horizontal plate mounted on the carriage slide 33 while the jaw 32 is pivoted to the jaw 31 by reason of carrying a rock shaft 34 extending through that jaw. Torsion springs 35 tend to keep the jaws together to grip the plate. A suitable lip 36 on a movable jaw furnishes convenient means by which it may be raised manually to release the plate.

The jaws are movable from front to rear as a unit with reference to the slide 33 which carries the lower jaw to present the plate properly for embossing in different lines. The jaw 31 rigidly carries a pair of slide rods 38 which slide through the cross slide 33. This jaw also carries a rack 40 with which meshes a pinion 41 on a short shaft which carries at its end a knob 43. A suitable spring pressed ball 44 (Figs. 3 and 6) acts as a detent, preventing inadvertent displacement of the pinion and rack. The plate is positioned as desired manually by the operator grasping the knob 43 and turning it to bring the proper region of the plate into embossing position. Following the completion of a line, the knob is turned one or more teeth to reposition the plate for a new line.

The cross slide 33, which carries the jaws, is slidably mounted on a block 50 which is shifted laterally by the actuated solenoid and stopped by the key lever heretofore referred to. The mounting of the cross slide 33 on the block is such that there may be lateral movement between them to enable the leftward feeding of the plate for each character space, as will be hereinafter described in detail, but for the positioning of each plate corresponding to the key depressed, the cross slide 33 and the block 50 operate as a unit.

The block 50 is slidably mounted on a stationary rod 53 and at its forward end carries rollers 54 engaging a trackway comprising a groove in a stationary bar 64. A pair of helical springs 55 surround the bar 53 between the opposite sides of the block 50 and the two brackets 56 and 57 which carry the bar 53. These springs are balanced against each other and serve to bring the carriage to central position after it has been moved in either direction and released.

The mechanism for moving the block 50 will now be described. On opposite sides of the keyboard, suitably carried by the frame plate 10, are a pair of housings 81 carrying solenoid magnets 80 operating on a transverse core bar 82. This core bar is connected by a link 83 with a lever 84 which is pivoted at its forward end 85 to a suitable frame

standard 86 and at its rearward end is bifurcated at 87 (Fig. 5) and embraces a block 88 pivoted on a pin 89 carried by a forward extension 52 of the block 50. It is to be understood that the right hand half of the set of key levers 21 energizes the right hand magnet 80 and the left hand half energizes the left hand magnet 80.

The closing of the circuits of the magnets to energize them, may be effected in any convenient manner. I have shown (Figs. 1, 2 and 3) beneath each bank of key levers a bail 90 adapted to be depressed by any lever in that bank and overhanging a plunger 91 normally raised by a spring 92 but adapted when depressed to bring into engagement a pair of terminals 93 which control the current to the corresponding solenoid.

At the same time that the depression of the forward end of the key lever energizes the corresponding solenoid and causes the shifting of the block 50 in that direction, the rising rear end of the lever serves to stop that block in a lateral position corresponding to the key depressed, the block carrying mechanism, now to be described, which engages such elevated rear end.

Referring to Figs. 5 and 11, it will be seen that the block 50 carries a pair of stopping members 100 which are adapted to engage any elevated key lever as illustrated in the case of the lever 21^a in Figs. 11 and 15. These stops 100 are preferably carried by rods 101 which are slidably mounted in the block 50 and are normally drawn outwardly to the limit by compression springs 103 surrounding the rods and compressed between the blocks and suitable nuts 104 on the rods. This enables the stops to have a limited inward movement under spring control, thus providing a shock absorber for receiving the blow when the plate comes to rest by reason of the stop engaging the raised key lever.

Upon the engagement of the stop with the key lever, the block is locked in that position by reason of the corresponding plunger 60 rising over the key lever (due to the beveled underface of the plunger) and dropping behind it. The upward movement of the plunger 60 initiates the action of the clutch as about to be explained.

The two plungers 60 referred to are mounted in vertical ways in the block 50 between its end walls and two partitions 51 within it. These plungers lie directly beneath a universal bar 61 which extends across the machine and is pivoted at 62 to a pair of brackets 63 which are mounted on a stationary cross bar 64 which supports the forward end of the block 50. At one end of the universal bar, it is connected by a link 66 with a lever 67, the rear end of which normally engages the clutch 70 and holds it out of action. Accordingly, whenever one or the other of the plungers 60 is raised by reason of the plate carriage coming to active position the clutch is automatically released.

I have shown a main driving pulley 71 adapted to receive power through a suitable belt. This pulley is loose on a main shaft 72 journaled in bearings in standards 73 and 74, and is connected to operate the embossing plungers as hereinafter explained. The pulley may be coupled with the main shaft by the following clutch mechanism.

Mounted on the shaft 72 along side of the pulley and pinned to the shaft is a clutch disc 75 which stands within a ring 76 bolted to the side of the pulley. In the periphery of the clutch disc are notches 77 in which are mounted rollers 78 adapted when freed to make a binding connection between the clutch disc and ring 76. The rollers are normally held out of such engagement and against the action of springs 79 tending to seat them by pins 110 carried by a ring 111 which has two diametrically opposed ears 112. This ring 111 is held in place against the face of the clutch disc by a disc 113 secured to the clutch disc.

Either ear 112 is adapted to be engaged by a pin 68 on the end of the lever 67 connected to the universal bar 61 heretofore mentioned. The mechanism therefore normally holds the rollers 78 back from binding engagement between the clutch disc and the pulley. Now when one of the plungers 60 raises the universal bar 61, the link 66 swings downwardly the rear end of the lever 67 and frees the clutch ring 111, whereupon the springs 79 force the rollers into binding engagement and immediately the clutch begins to rotate with the driving pulley.

Shortly after the clutch ear 112 has cleared the pin 68, the plunger 60 drops by reason of passing beyond the raised rear end of the key lever and thereupon the spring 69 acting on the link 66 pulls down the forward end of the lever 67 and raises the pin 68 into the path of the other clutch ear 112. This automatically stops the rotation of the clutch and shaft at the end of a half rotation.

The main shaft 72 is adapted to operate the cam 120 which operates the embossing plunger. I find it convenient to place this cam 120 on a lay shaft 121 parallel with the shaft 72 and geared with it by gears 123 and 124. This lay shaft is mounted in the frame brackets 73 and 125 and carries the cam 120 between these brackets. These brackets carry a pair of shafts 130 and 131 on which are mounted heavy arms 132 and 133, each of which carries at its rear end a plurality of rollers 134 mounted in recesses in the arms and adapted to bear upon the cam 120. The forward ends of these heavy arms carry adjustable bars 135 clamped against the end of the arms and accurately adjusted in position by set screws 136 mounted in the

arms. These bars 135 are adapted to act on the distance blocks 140 and 141 which are carried by the carriage and lie between the bars and the selected embossing dies.

The distance block 140 (Fig. 3) is carried by a leaf spring 142 secured to an inverted U-shaped bracket 143 mounted on the block 50. The distance block 141 is carried by a leaf spring 145 also secured to this block 50. This spring is shown as secured to the block by means of the two bolts 147 and 148 which provide sufficient space immediately adjacent the rear of the block for mounting the individual character spacing mechanism to be described.

The embossing dies are in four sets namely, a set of lower-case male dies 150, a set of upper-case male dies 151, directly behind the lower-case set, a set of lower-case female dies 152, and a set of upper-case female dies 153, these female dies being directly below the corresponding male dies. All of the dies are vertically slidable in a carrier 160. This die carrier comprises a pair of cross bars 161 and 162 connected at their ends to supporting blocks 163 and 164 with which they constitute an open rigid frame.

The dies are normally held in idle position in the carrier by means of the teeth of comb springs 165 occupying notches therein. The common head of these springs is secured to a rib 166 on a cross bar by means of a strip 168 bolted to the cross bar. The construction is the same for each of the four sets of dies. The outward movement of the dies under the returning action of the springs is limited by bridge bars 169 shown as made by a rectangular frame secured to the bars 161 and 162.

Fig. 3 shows the lower case dies in their active position in registration with the distance blocks and the plunger bars referred to. To bring the upper case dies into active position, it is only necessary to shift the whole die carrier forward. This is effected by a shift key and linkage mechanism best shown in Figs. 1, 2 and 3.

As appears in Fig. 1, there are two shift keys 170, which are mounted on the forwardly bent ends 171 of a bail 172, which is pivoted at 173 to suitable brackets 174, rising from the bed. To the bottom of the bail there are connected two links 175 leading to the rear end each connected at its rear end to a lever 176 pivoted intermediately to the brackets 73 and 125 and pivoted at their upper ends to the end blocks of the die carrier. A suitable spring 178 tends to maintain the parts in the position shown in Figs. 2 and 3, with the lower case dies in the active position. When, however, either shift key is depressed the die carrier is thereby shifted forwardly to bring the upper case sets of dies into active position.

I have referred to the fact that following the embossing of each character the jaws which carry the plate being embossed are fed to the left relative to the plate carrier block, a distance corresponding to the width of a character, so that the next character embossed will come in the proper place immediately at the right of the previous character. The mechanism for effecting this, designated 180 as a whole, will now be described with reference particularly to Figs. 3, 6 and 8.

Mounted on the pin 147 which is rigid with the block 50 is a ratchet wheel 181 and along side of this wheel is a vertically slidable plate 182 guided by being slotted about the pins 147 and 148. Pivoted to this plate is a pawl 184 carrying a tooth 185 adapted to coact with the ratchet wheel, a spring 186 drawing the pawl in that direction. A spring 187 tends to draw the plate into its lowermost position, the tooth passing idly over the ratchet in such action. When the plate carriage returns to central position following any impression, the lower end of the plate 182 rides up on one or the other of a pair of substantially stationary cam ears 190, Figs. 6, 8 and 10, and this causes the tooth 185 to turn the ratchet wheel 182 one tooth. Rigidly connected with this ratchet gear is a pinion 192 which meshes with a rack 193, formed on the cross slide 33, slidably mounted on the block 50 and carrying the pins 38 on which the plate gripping jaws are mounted.

It will be understood from the above description that following each embossing impression, and as the carriage returns to its central position, the plate is positioned relative to the carrier the width of one character toward the left so that when the carrier is next brought to active position the embossing will take place the proper distance to the right of the previously embossed character.

It is important to have mechanism to center the plate carrier normally in the central position and it is desirable that this means be associated with shock absorbing mechanism to bring the carrier gently to rest. A construction for this purpose is shown in Figs. 6, 7, 8 and 10. Mounted on the bed 10 is a suitable bracket 200 having three upstanding aligned posts 201, 202 and 203. Slidably mounted in the posts 201 and 203 are rods 204, each of which has rigidly secured to its inner end the head 205 of a bar 206 slidable in the tops of the respective posts 201 and 203. In the lower edge of the block 50 is a recess 207 covered in front by a plate 209 and open at the bottom. Slidably mounted in this recess are a pair of locking blocks 210 which are pressed downwardly by springs 211 above them. These blocks normally lie idly on one or the other of the bars 206. When, however, the carriage is just

coming to its central position the foremost block drops into the space between the two bars 206 and engages the end of that bar toward which the carriage is traveling and shoves it slightly along compressing the corresponding spring 208 which surrounds that rod 204. Just as this engagement takes place the other block 210 drops down into the space behind the foremost block. After the parts have moved a short distance beyond the center the compressed spring reacting returns the carriage to central position where the other block 210 engages the other head 205. Any return movement beyond the center is thus counteracted by the other spring 208. The carriage is thus almost instantly gently brought to rest and held by these two heads 205 in its central position.

The camlike ears 190 heretofore mentioned which operate the plate 182 which rotates the ratchet are carried by the two heads 205, so that if the carriage goes past the center the corresponding ear 190 is carried with it and the plate 182 is not allowed to drop.

We have mentioned that the locking blocks 210 drop into the space above the post 202 between the inner ends of the two bars 206. Fig. 8 shows a block in the position it assumes just after it has been raised out of the central notch and before it has moved laterally over one of the bars 206. In the normal position the sliding block 215 hereinafter described is farther forward than shown in Fig. 8 and allows space above it into which the blocks 210 may drop.

As shown in Fig. 8, there is on the rear end of each key lever 21 a lug 221 which is adapted to engage the overturned end 222 of a universal bar 223 pivoted at 224 to a frame standard. This universal bar lies directly in front of the sliding block 215, the block being pressed toward it by a spring 216. When the machine comes to rest following the embossing of a character, the locking blocks 210 stand depressed above the reduced portion 217 of the block 215, as shown in Fig. 3, and the carriage is thus locked in central position. Now when the next key is struck the rising rear end of its lever causes the lug 221 thereon to cam against the end of the universal bar 223 and force that bar rearwardly to shove rearwardly the sliding block 215 against the action of the spring 216. This causes the cam surface 218 (Fig. 8) on this block to ride against the front lower corner of the blocks 210 and raise them out of the space between the heads 206. In this movement a toe 214 on the lower edge of each block 210 comes into engagement with a corresponding notch in the block 215 directly in front of the cam surface 218. This engagement is sufficient to prevent the block 215 from returning to its normal forward position after the rear end of the key lever has been elevated sufficiently to cause the lug 221 to clear the overturned end 222 of the universal bar 223.

As soon as the lug 221 on the key lever has cleared the universal bar, a spring 226, Fig. 15, swings the universal bar forwardly so that its upper end 222 passes beneath the lug 221, thus holding the key lever in this position. Now the engagement of the toes 214 with the block 215 prevents this block following the universal bar until the carriage has moved laterally under the action of the solenoid sufficiently to carry the blocks 210 out of engagement with the block 215. Thereupon the spring 216 shoves the block 215 forward into its normal position.

To release the universal bar 223 from holding the actuated key lever in its actuated position I provide mechanism shown in Figs. 2, 5 and 15, enabling the return movement of one of the embossing levers to release the universal bar. Secured to the forward end of the lower embossing lever 133 is an arm 230 projecting forwardly and carrying at its forward end a dog 231 pressed forwardly by a spring 232 and having a tooth 233 adapted to rise above an arm 234 projecting rearwardly from the universal bar 223. The embossing movement of the arm 133 carries the pawl into the position shown in Fig. 15. Then as the embossing arms separate under the action of the spring 139 when the cam 120 allows such operation, the arm 230 carries downwardly the dog 231 and presses the arm 234, swinging rearwardly the universal bar 223 and releasing the key. When the dog comes into its lowermost position, a stationary bracket 236 cams it away from the arm 234 of the universal bar.

To enable the beginning of each line of embossing to be positioned as desired, for instance so that the successive lines may be arranged in echelon, I provide on the ratchet pawl 184, an extension 240 (Figs. 1 and 6) carrying at its end a key 241. The depression of this key releases the ratchet wheel and thus enables the carriage to be shifted manually in either direction as desired. This provides not only for selecting the beginning of the line in the desired position, but also enables back spacing, whereby any proper character may be stamped out and a new character struck in its place. To enable such stamping out of an improper character, I may if desired provide a pair of flat faced dies operated by a suitable key in the keyboard, though ordinarily, it is sufficient to strike the proper character at once over the improper one.

To enable the machine to provide for spaces between embossed characters without taking the time required for the actuation of the embossing mechanism, which would operate idly, I provide a special construc-

tion at the rear end of the space bar lever which will now be described with reference to Figs. 1 and 16.

The space bar 250 is mounted on a pair of levers 251 and 252. The lever 252 extends rearwardly of the common pivot rod 253, Fig. 16, and is provided at its rear end with a lug 255 to engage the universal bar 223 and swing it rearwardly to release the plate carrier. The lug 255 is of such shape as to hold the bar 223 rearwardly until the space bar is released. The space bar lever 252 has its upper rear end cut away as shown at 256 so that in its uppermost position such bar does not stand in the path of the stops 100 and plungers 60. The space bar, however, does actuate the solenoid, so that immediately upon depression of the key, the carriage begins to move, and as soon as it moves, the ratchet operating plate 182 passes off the cam ears 190, Fig. 6, and the pawl 185 descends into engagement with a fresh ratchet tooth. Now as soon as the operator takes his finger off of the space bar, the spring 258 returns the bar, and, the solenoid circuit being opened, the corresponding spring 55 returns the carriage to central position. At the same time, the release of the space bar lever releases the universal bar 223 which swings forwardly and this allows the sliding block 215, Fig. 8, to return to forward position enabling the blocks 210 in the carriage to drop into the central retaining space between the bars 206.

It will be understood from the above description that the mechanism of my machine is comparatively simple and is adapted for mounting in a very compact machine. A suitable metallic blank for embossing may be very readily inserted in the jaws, and positioned as desired for starting the operation and thereafter it is only necessary to depress the keys to emboss a line, the operator having both hands available for manipulation of the keys. Then, by means of the hand knob, he may bring the plate to position for another line, and may shift it laterally if desired, upon depressing the ratchet release key,—and so on until the plate is completed. At the end of the operation, the jaws are separated and the plate removed manually, and it may then be readily inserted into a suitable plate holder, as for instance, the holder designated B in Fig. 17.

I claim:—

1. In an embossing machine, the combination with embossing dies, of a shiftable carriage adapted to carry the material to be embossed, a keyboard having keys corresponding to different characters, and mechanism controlled by the keyboard for shifting the carriage to bring the material into coaction with a corresponding die.

2. In an embossing machine, the combination of embossing dies, a shiftable carriage movable from a definite position of rest and adapted to carry material to be embossed, a keyboard, mechanism controlled thereby for shifting the carriage and stopping it in registration with the corresponding die.

3. In an embossing machine, the combination with embossing dies of a shiftable carriage adapted to carry the material to be embossed and means for automatically returning the carriage after each impression to a central position of rest.

4. In an embossing machine, the combination with embossing dies of shiftable carriage adapted to carry the material to be embossed and having a central position of rest, a keyboard and mechanism controlled thereby for shifting the carriage in either direction from said central position.

5. In an embossing machine, the combination of embossing dies, a shiftable carriage movable from a definite position of rest and adapted to carry material to be embossed, a keyboard, mechanism controlled thereby for shifting the carriage and for stopping it in registration with the corresponding die and a spring for automatically returning the carriage to initial position.

6. In an embossing machine, the combination with embossing dies of shiftable carriage adapted to carry the material to be embossed and having a central position of rest, a keyboard having its keys divided into two banks, and mechanism controlled by said banks respectively for shifting the carriage from said central position in one direction for one bank and in the opposite direction for the other.

7. In an embossing machine, the combination with embossing dies of a shiftable carriage adapted to carry the material to be embossed, electromagnetic means for moving the same, a keyboard having keys corresponding to the characters to be embossed, and mechanism whereby the depression of a key closes the circuit of the electromagnetic mechanism.

8. In an embossing machine, the combination with embossing dies of a shiftable carriage adapted to carry the material to be embossed, electromagnetic means for moving the same in either direction from a central position of rest, a keyboard having keys corresponding to the characters to be embossed, said keys being arranged in two banks, and mechanism whereby the depression of a key closes the circuit of the electromagnetic mechanism to move the carriage in a direction determined by the bank in which the key is located.

9. In an embossing machine, the combination with embossing dies, of a shiftable carriage, a keyboard, automatic mechanism actuated by the keyboard for moving the

carriage, and automatic mechanism for giving the material carried by the carriage an additional unit movement corresponding to the width of the character embossed.

10. The combination of embossing dies, a keyboard, a carriage, mechanism whereby the carriage is moved laterally, and then stopped by the depression of a key in the keyboard, said carriage having a slide, means on the slide for carrying material to be embossed, and means for moving the slide relative to the carriage a distance corresponding to the width of the character embossed.

11. In an embossing machine, the combination with embossing dies of a keyboard, a carriage, mechanism intermediate the carriage and keyboard whereby the depression of a key causes the shifting of the carriage, a member movable on the carriage and adapted to carry the material to be embossed, and a periodically operated ratchet mechanism acting to shift said member relative to the carriage.

12. The combination with embossing dies of a keyboard having keys corresponding to the dies, a carriage, mechanism actuated by the keys for moving the carriage into registration with corresponding dies from a position of rest, a slide on the carriage, means on the slide for carrying the material to be embossed, and mechanism for moving the slide relative to the carriage as the carriage is coming to rest.

13. The combination with embossing dies of a carriage, mechanism for bringing it normally to a definite position of rest, mechanism for moving the carriage into registration with corresponding dies from said definite position of rest, a slide on the carriage, means on the slide for carrying the material to be embossed, mechanism for moving the slide relative to the carriage by unit movements, and a cam adapted to be engaged by said mechanism and operate it as the carriage is coming to rest.

14. The combination with embossing dies, of a laterally shiftable carriage, a laterally movable slide on the carriage adapted to carry material, a ratchet for controlling the relation of the slide to the carriage, a vertical slide for operating the ratchet, a cam with which the vertical slide coacts, a keyboard, and mechanism controlled thereby for positioning the carriage.

15. In an embossing machine, the combination with embossing dies of a carriage having a central position of rest, a keyboard divided into two banks, mechanism controlled by the respective banks for shifting the carriage in one direction or the other and stopping it in registration with the die corresponding to the key actuated, a laterally movable slide mounted on the carriage, mechanism on the slide for holding the material to be embossed, ratchet mechanism for moving the slide relative to the carriage, and a device for operating the ratchet mechanism when the carriage returns to central position.

16. The combination with embossing dies of a movable carriage having a central position of rest, means for moving it in either direction therefrom, springs for returning it to central position, means on the carriage for holding material to be embossed, mechanism for giving a unit movement to said means as the carriage returns to central position, and mechanism for preventing inopportune operation of said mechanism if the carriage passes beyond the center.

17. In an embossing machine, the combination with embossing dies of a shiftable carriage, a slide on the carriage, a rack on the slide, a pinion meshing with the rack, a ratchet wheel connected with the pinion, a movable member having a pawl to operate the ratchet wheel, and cam mechanism coacting with said member as the carriage returns to rest position.

18. In an embossing machine the combination with embossing dies of a shiftable carriage, mechanism for returning it to a normal definite position of rest, a keyboard, mechanism controlled by the keyboard for moving the carriage from its position of rest to various operative positions, a slide on the carriage, mechanism for giving it a unit movement with reference to the carriage, a gripper slidably carried by the slide and movable in a direction transverse to its movement whereby a plate carried by the gripper may be variably presented to the dies, and mechanism for giving the gripper a movement toward or from the dies.

19. In an embossing machine, the combination with dies of a carriage shiftable relative thereto and provided with means for carrying material to be embossed, operating mechanism common to a set of dies and spaced therefrom, and a shiftable distance block common to a set of dies and adapted to stand between the operating mechanism and a selected die.

20. In an embossing machine, the combination of dies, a shiftable carriage for holding material to be embossed, operating mechanism for the dies spaced therefrom, a spring carried by the carriage, and a distance block supported by the spring between the operating mechanism and selected die.

21. In an embossing machine, the combination of dies, a shiftable carriage for holding material to be embossed, operating mechanism for the dies spaced therefrom, a shiftable distance block between the operating mechanism and the dies, a keyboard, and mechanism controlled thereby for moving the carriage and block in either direction from an intermediate position of rest.

22. In an embossing machine, the combination of a die holder, male and female dies therein arranged in two rows with their faces opposed to each other, plates extending parallel with the two rows of dies and spaced therefrom respectively, mechanism for moving said plates toward the dies, distance blocks lying between the plates and the heels of the dies and movable transversely as a unit to select particular dies, a carrier movable parallel with the die holder, means on the carrier for holding a plate to be embossed extending into the space between the two rows of dies, and a pair of spring arms carried by the carrier and freely supporting the two distance blocks.

23. The combination with embossing dies, of mechanism for operating the same, a partial rotation clutch adapted when released to make an aliquot fraction of rotation and stop, cam mechanism operated by said clutch for operating the dies, a carriage carrying material to be embossed, means for positioning the carriage, and mechanism operating automatically consequent upon the carriage coming to position to release the clutch.

24. In an embossing machine, the combination of a trough shaped die carrier having two rows of male dies in one leg of the trough and two rows of female dies in the opposite leg constantly opposite each other, a movable plate carriage, a plate gripper carried thereby and adapted to grip the plate at the edge distant from the dies with the plate projecting freely into the trough of the die holder, and shift mechanism for changing the relation of the plate to the rows of dies.

25. In an embossing machine, the combination with a die carrier, of two rows of male dies and two rows of female dies mounted therein, said male and female dies respectively registering but spaced apart, mechanism for carrying material to be embossed between the male and female dies, shift mechanism for moving the die carrier, shiftable distance blocks adapted to select corresponding dies, and operating mechanism coacting with the distance blocks, whereby the distance blocks operate on either row of dies as selected by the shift mechanism.

26. In an embossing machine, the combination with two rows of male dies and two rows of female dies respectively registering therewith but spaced therefrom, a shiftable carriage, mechanism thereon for carrying material to be embossed between the male and female dies, shift mechanism for moving the die carrier toward and from the plate carrier, distance blocks carried by the carrier and adapted to select corresponding dies, and operating mechanism coacting with the distance blocks, whereby the distance blocks operate on the dies in either row as selected by the shift mechanism and the plate carriage.

27. In an embossing machine, the combination with rows of embossing dies, of carriage for the material to be embossed, said carriage having a block slidably mounted on a rod parallel with the dies, a slide on the block slidably parallel to the dies, a gripper on the slide slidable transversely to the dies, two vertical ways in the block, vertically slidable bevel-nosed locking members mounted in said ways, and a keyboard having key levers with which said locking members coact.

28. In an embossing machine, the combination with the dies, of a shiftable carriage adapted to support the material to be embossed, a pair of shock absorbing carriage-centering devices, means on the carriage adapted to enter the space between said devices and coact therewith, whereby the carriage is gently centered, and means for shifting the carriage a character-space consequent upon its coming to central position.

29. In an embossing machine, the combination with the dies of a shiftable carriage, means thereon for supporting the material to be embossed, a center lock for the carriage comprising a pair of aligned compression springs having a recess between them, a member on the carriage adapted to move into the space between said springs as the carriage comes into central position, and mechanism carried in part by the center lock for giving the carriage a character-space feed.

30. In an embossing machine, the combination with the dies, of a carrier for supporting the material to be embossed, said carrier having a center lock to hold it normally in central position, a keyboard having key levers, mechanism whereby the actuation of a key lever releases the center lock, mechanism for moving the carriage until it is brought to rest by the actuated key lever.

31. In an embossing machine, the combination with the dies, of a shiftable carriage, a slide thereon, means on the slide for carrying a plate to be embossed, mechanism for operating the slide step by step, a shock absorbing center lock for the carriage, and means carried thereby for operating said mechanism.

32. In an embossing machine, the combination with facing male and female dies, a shiftable carriage for carrying material to be embossed, a pair of leaf springs carried by the carriage and projecting onto opposite sides of the two rows of dies, distance blocks on the ends of the leaf springs registering with dies selected by the position of the carriage, and plunger mechanism coacting with the distance blocks.

33. In an embossing machine, the combination of cooperative sets of male and female dies, each set corresponding to the characters of an alphabet, a shiftable carriage adapted to carry material to be embossed, a keyboard having keys corresponding to different characters, mechanism controlled by the keyboard for shifting the carriage to various positions to bring the material into coaction with a pair of male and female dies corresponding to the key actuated, and mechanism for causing the selected dies to emboss the material.

34. In an embossing machine, the combination of male and female dies having various characters, a shiftable carriage movable from a definite position of rest and adapted to carry material to be embossed by said dies, a keyboard mechanism controlled thereby for shifting the carriage from said position of rest to various positions and stopping it in registration with corresponding dies, and means for automatically returning the carriage after each impression.

35. In an embossing machine, the combination with male and female dies having various characters, of a shiftable carriage adapted to carry the material to be embossed, means for causing the dies to approach each other to emboss the material, and means for automatically returning the carriage after each impression to a central position of rest.

36. The combination with an alphabetical set of dies, of a shiftable carriage adapted to carry material to be impressed, said carriage having a central position of rest, a keyboard, and mechanism controlled thereby for shifting the carriage in various distances in either direction from said central position.

37. The combination with a set of male embossing dies, a corresponding set of female embossing dies respectively opposed thereto, of a shiftable carriage adapted to carry material between the respective sets of dies, said carriages having a central position of rest, a keyboard, and mechanism controlled thereby for shifting the carriage in various distances in either direction from said central position.

38. The combination with male and female character dies, of a shiftable carriage movable from a different position of rest and adapted to carry material to be embossed, a keyboard, mechanism controlled thereby for shifting the carriage and stopping it in registration with the corresponding dies, means for causing such selected dies to approach each other to emboss the interposed material, and spring means for automatically returning the carriage to initial position.

39. The combination with dies corresponding to the letters, numerals and punctuations of ordinary typewriting, of a shiftable carriage adapted to carry material to be impressed by said dies and having a central position of rest, a keyboard having its keys divided into two banks, and mechanism controlled by said banks respectively for shifting the carriage various distances from said central position, the movement being in one direction for one bank and in the opposite direction for the other bank.

40. The combination with cooperative sets of male and female dies, each set corresponding to the letters, numerals and punctuations of ordinary typewriting, of a shiftable carriage adapted to carry material to be embossed by said dies and having a central position of rest and keyboard having its keys divided into two banks, and mechanism controlled by said banks respectively for shifting the carriage from said central position, the movement being in one direction for one bank and in the opposite direction for the other bank.

41. In an embossing machine, the combination with male and female letter character dies, of a shiftable carriage adapted to carry the material to be embossed, electro-magnetic means for moving the same, a keyboard having keys corresponding to the letters to be embossed, mechanism whereby the depression of a key closes the circuit of the electro-magnetic mechanism, and power mechanism automatically actuated consequent upon the carriage coming to position to move selected dies toward each other to emboss the material.

42. In an embossing machine, the combination of male and female character dies, of a shiftable carriage adapted to carry the material to be embossed, electro-magnetic means for moving the same in either direction from a central position of rest to various positions, a keyboard having keys corresponding to the characters to be embossed, said keys being arranged in two banks, mechanism whereby the depression of a key closes the circuit of the electro-magnetic mechanism to move the carriage in a direction determined by the bank in which the key is located and to a position determined by the particular key depressed.

43. In an embossing machine, the combination with coacting sets of male and female dies having various characters, of a shiftable carriage, a keyboard, automatic mechanism actuated by the keyboard for moving the carriage to a position determined by the key actuated, and automatic means for giving the material carried by the carriage an additional unit movement corresponding to the width of the character embossed.

44. The combination of male and female embossing dies having various characters,

a carriage having a slide, means on the slide for carrying material to be embossed, a keyboard having keys corresponding to said characters, mechanism controlled by the depression of a key in the keyboard for moving the carriage laterally and stopping it with the material in juxtaposition with a pair of dies corresponding to the key depressed, and means for moving said slide relative to the carriage a distance corresponding to the width of the character embossed.

45. The combination with coacting opposed sets of male and female embossing dies corresponding to the characters of an alphabet, of a keyboard having keys corresponding to the same alphabet, a carriage having a slide, means on the slide for carrying material to be embossed, mechanism controlled by the depression of a key in the keyboard for moving the carriage laterally and stopping it with the material in juxtaposition with a pair of dies corresponding to the key depressed, mechanism for moving the dies thus selected toward each other to emboss the interposed material, and means for moving said slide relative to the carriage a distance corresponding to the width of the character embossed.

In testimony whereof, I hereunto affix my signature.

CLIFTON CHISHOLM.