

Feb. 4, 1936.

J. J. BRAUND

2,029,651

EMBOSSING APPARATUS

Filed April 22, 1935

6 Sheets-Sheet 1

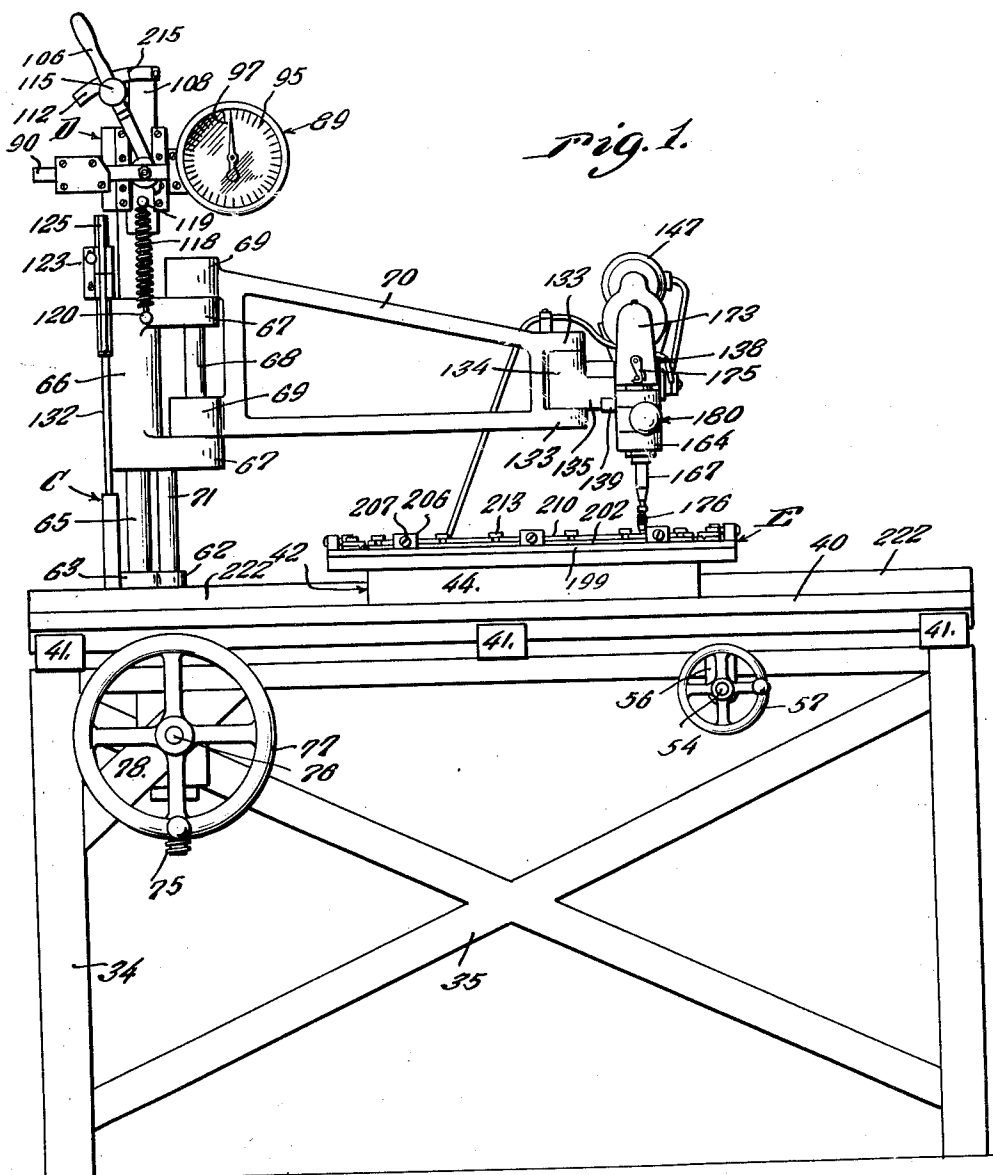


Fig. 24.

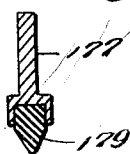
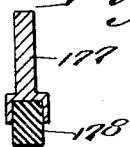


Fig. 25.



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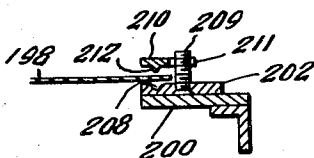
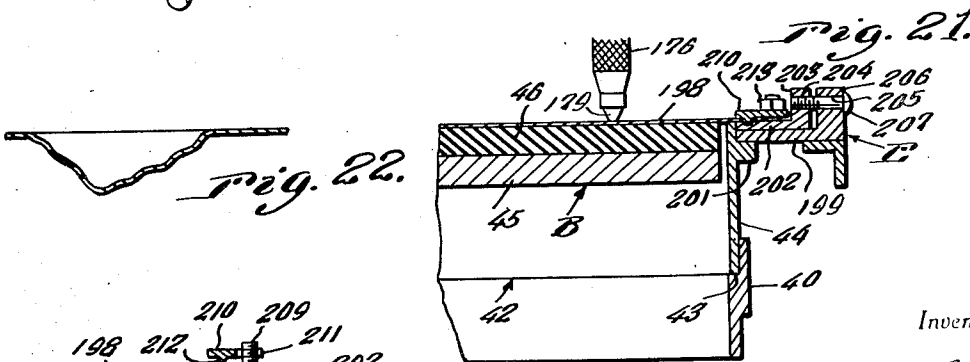
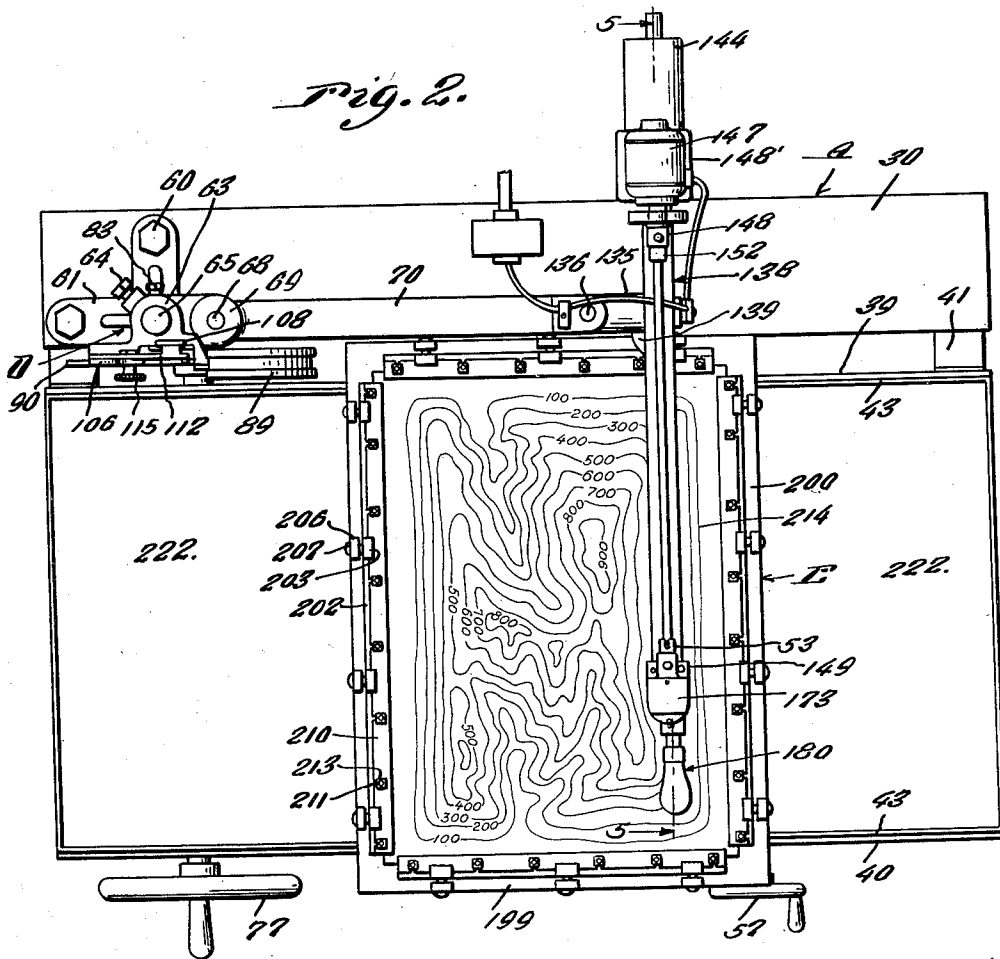
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6 Sheets-Sheet 2



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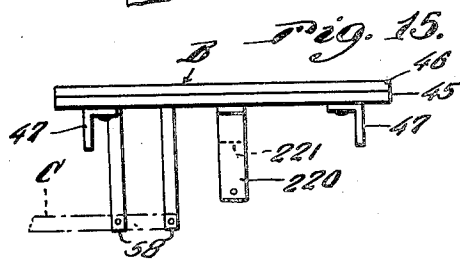
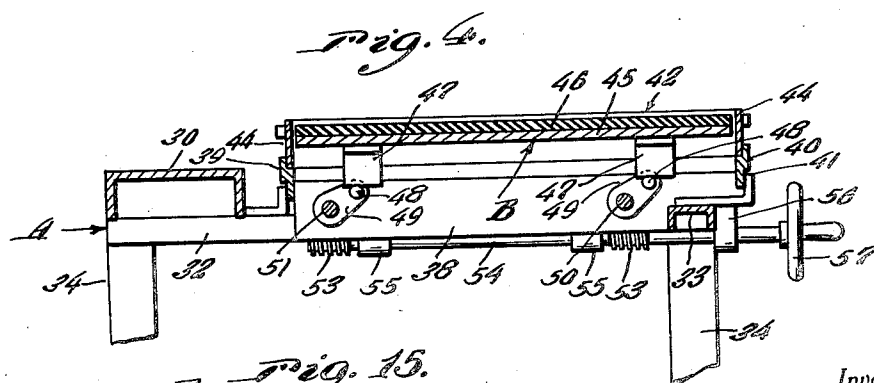
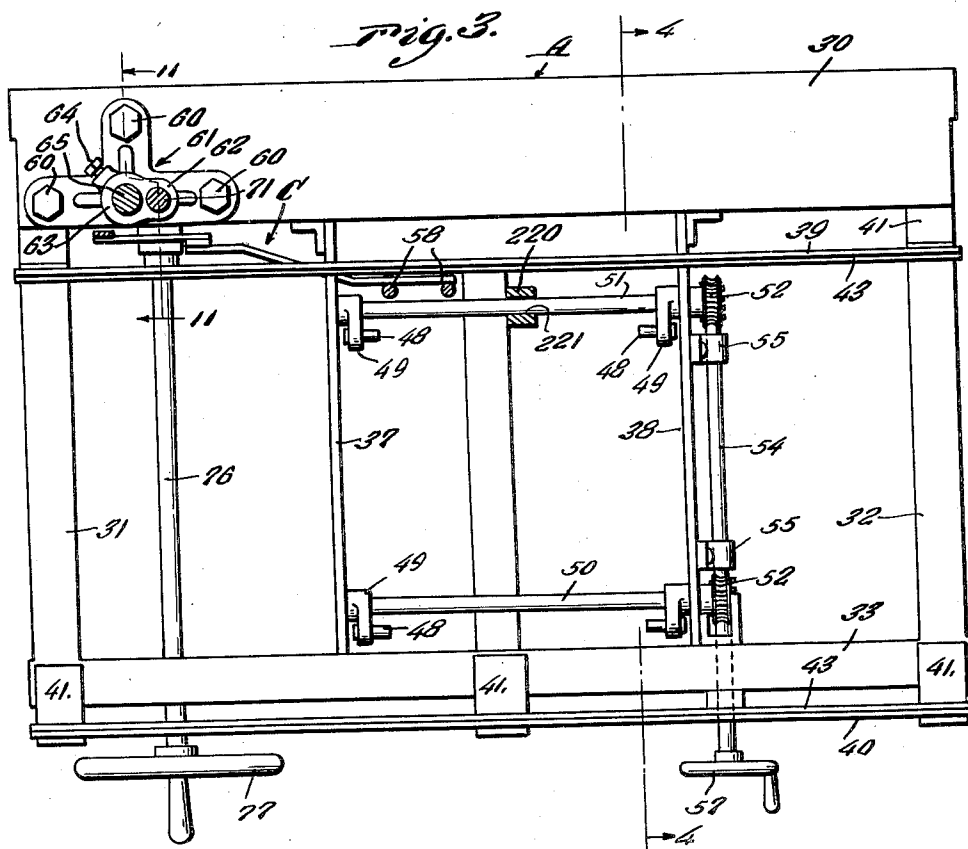
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EMBOSSING APPARATUS

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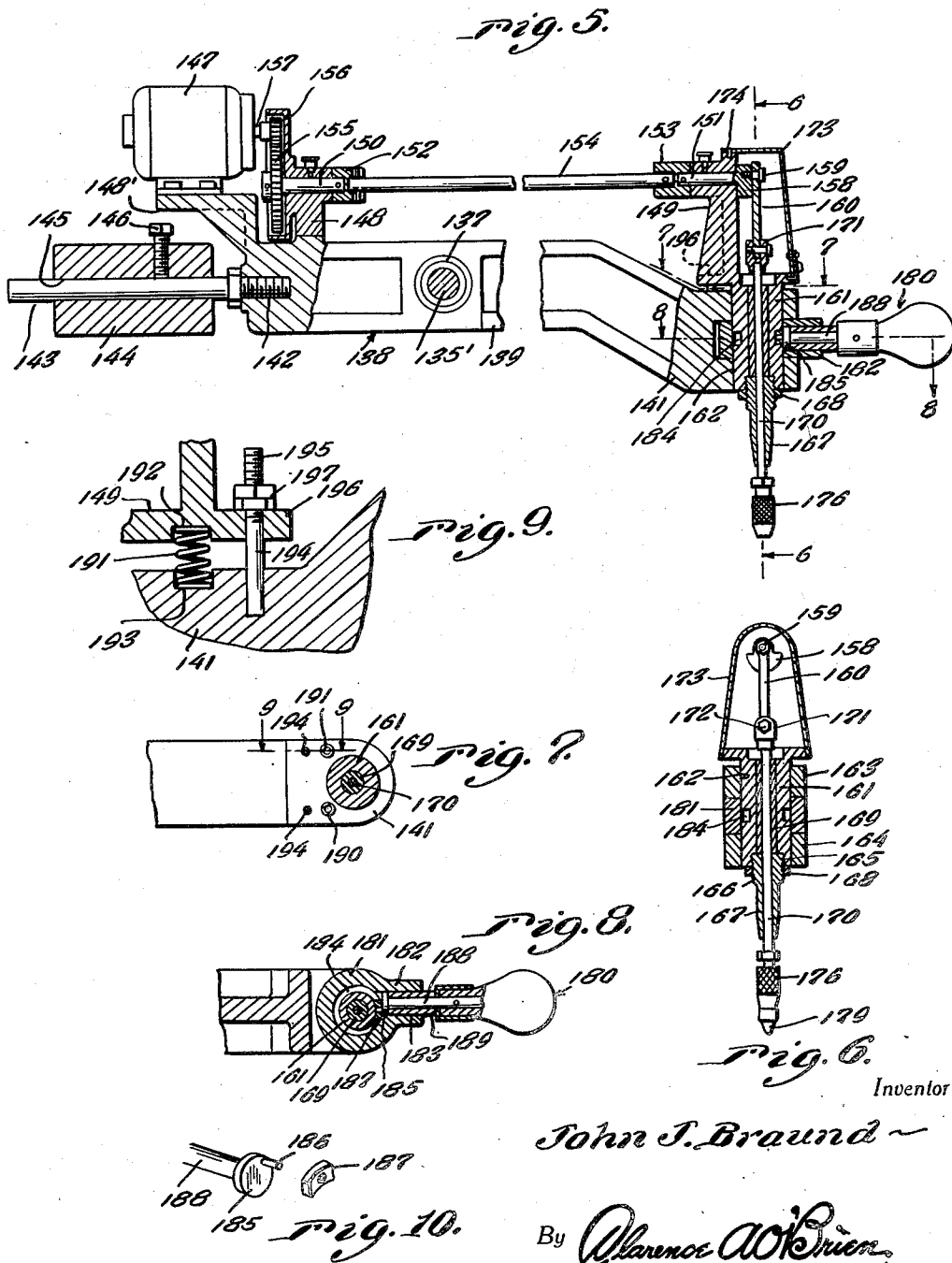
J. J. BRAUND

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EMBOSSING APPARATUS

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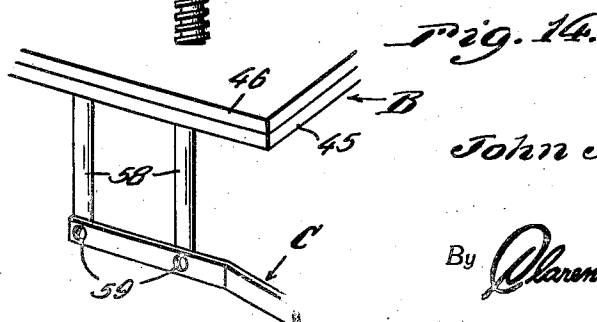
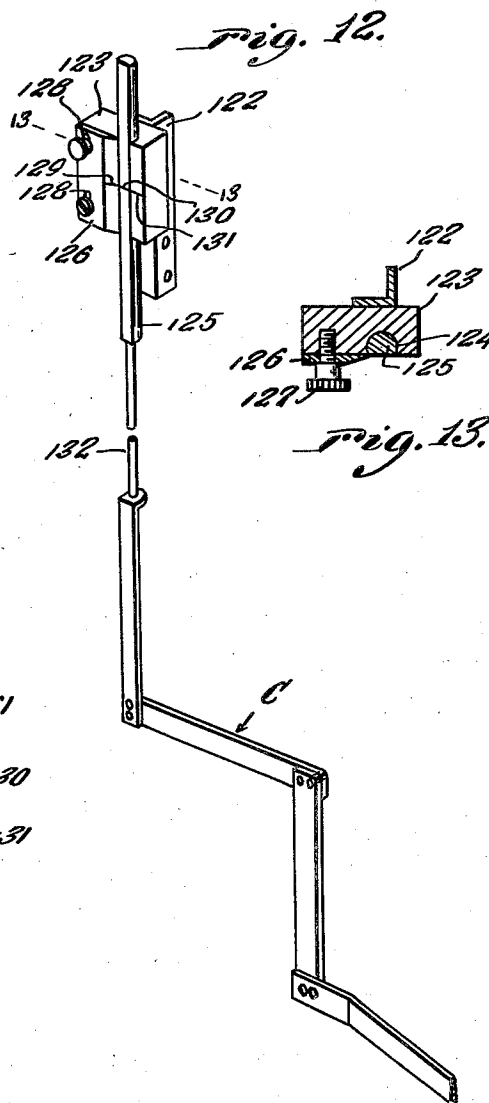
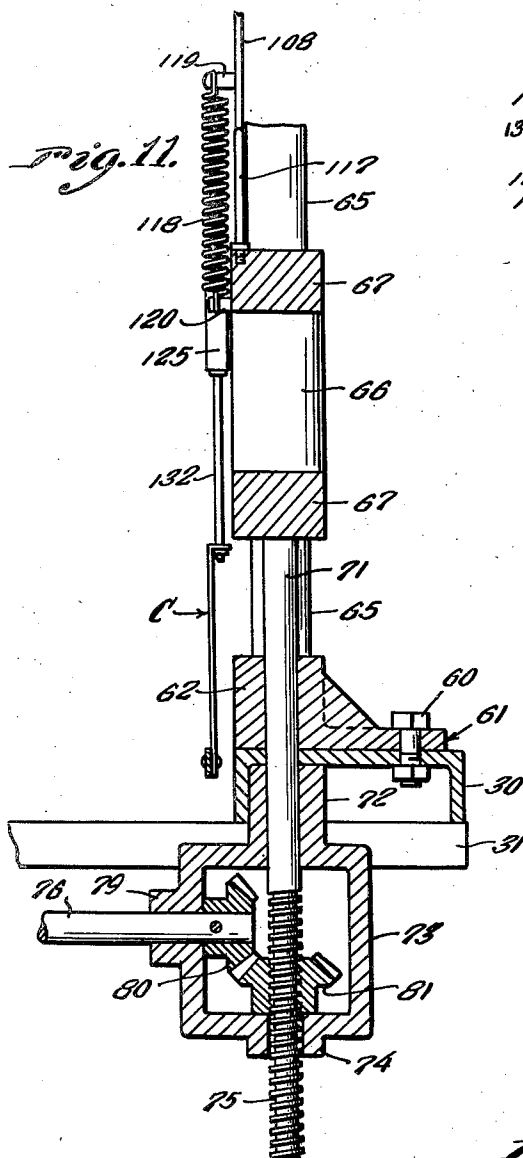
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EMBOSSING APPARATUS

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6 Sheets-Sheet 5



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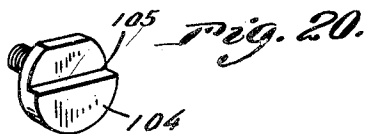
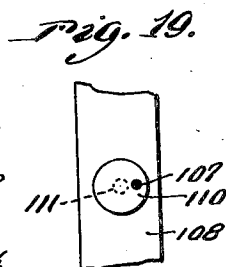
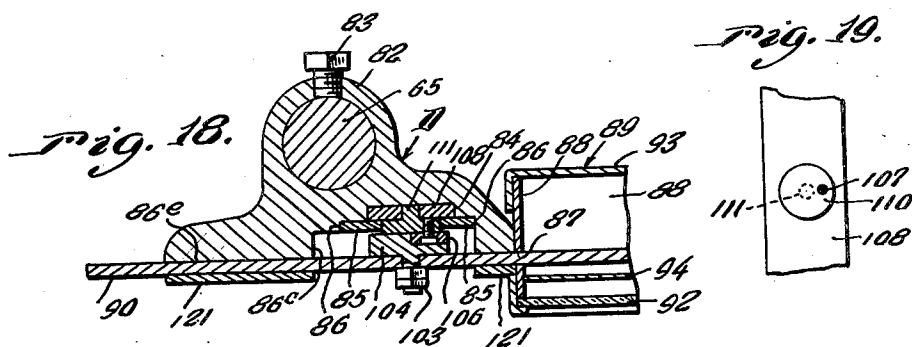
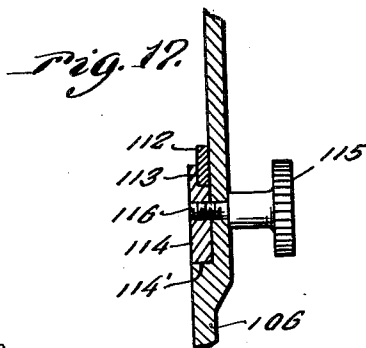
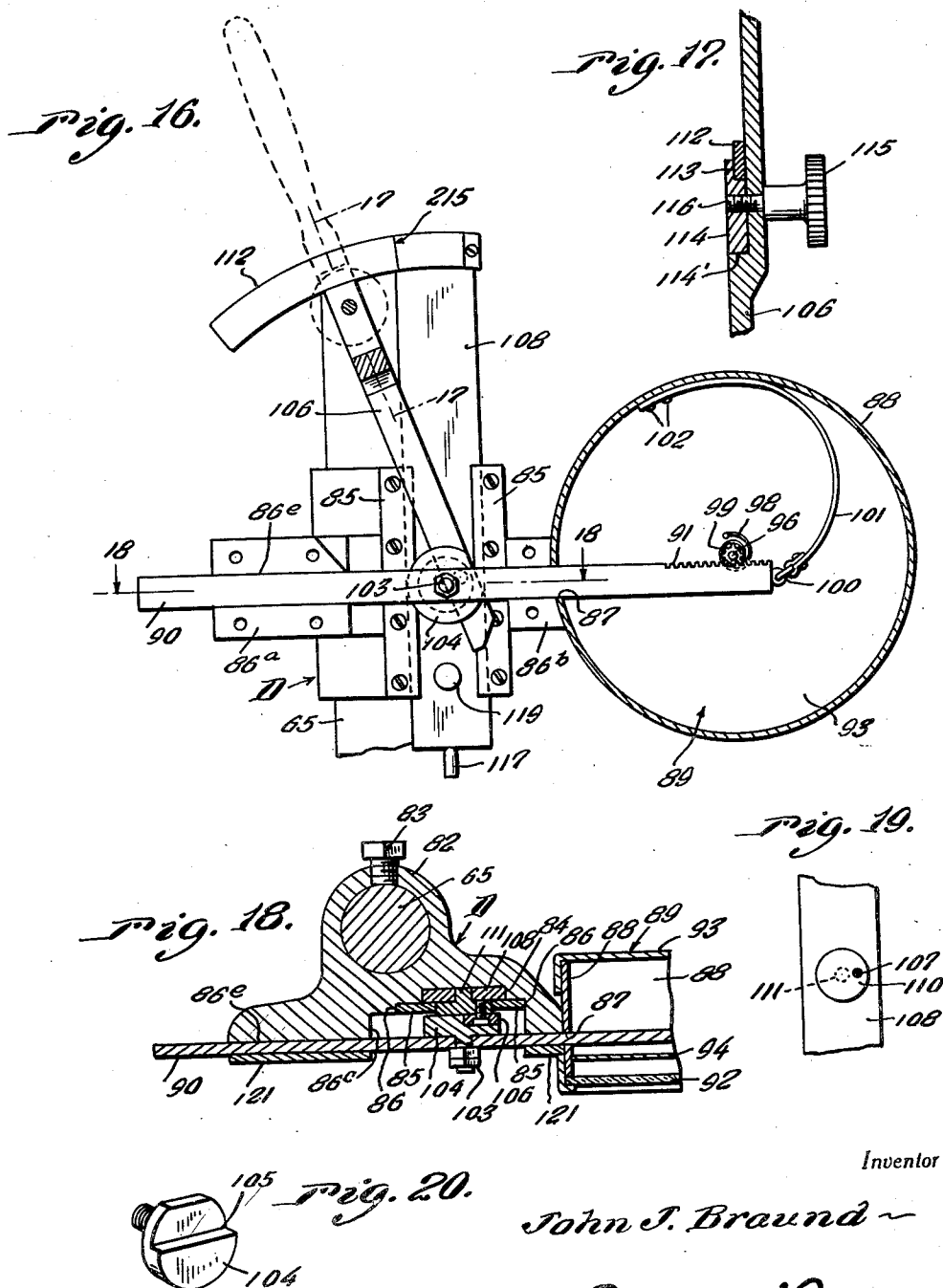
J. J. BRAUND

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EMBOSSING APPARATUS

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6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

2,029,651

EMBOSSING APPARATUS

John J. Braund, Washington, D. C.

Application April 22, 1935, Serial No. 17,704

22 Claims. (Cl. 101—3)

This invention relates to embossing apparatuses and is an improvement upon my United States Patent 1,860,729, May 31, 1932, and applies the method of embossing in my Patent No. 1,866,448, July 5, 1932.

The primary purpose of the present invention is to devise an embossing apparatus which may be manipulated with precision by any operator by turning control wheels placed at convenient locations on the table of the machine and which apparatus saves time and labor in completing the embossing operation.

Another feature of the invention is the provision of a movable backing platform to render the definition of the contour more distinct which platform insures the different elevations terminating in the same or approximately the same plane.

Another advantage of the present invention is the provision of a mechanism on the handle of the hammer head to overcome damage to the work sheet caused by excessive vibration in the hammer which mechanism retains the hammer in retracted position requiring the turning of the handle on the hammer to project the hammer to working position and upon the release of the handle renders the hammer stroke ineffective without raising the entire hammer head on its axis.

Another object of the invention is the provision of gauges on the apparatus with the use of which any total depth of the elevation to be embossed may be divided into equal parts to represent any number of different elevations desired.

Another object of the invention is to coordinate an indicator of the backing platform with the movement of the hammer head whereby the platform may be moved in proportion to the hammer head on each step of the embossing operation.

A further object of the invention resides in the construction of a frame for controlling the tension on the work sheet to insure more uniformity in the maps.

With the foregoing and other objects in view the invention consists of a novel construction, combination and arrangement of parts as will be hereinafter more specifically described and illustrated in the accompanying drawings, wherein is disclosed an embodiment of the invention, but it is to be understood that changes, variations, may be resorted to without departing from the spirit of the claims hereunto appended.

In the drawings wherein is disclosed the preferred embodiment of the invention and wherein like reference characters denote corresponding parts throughout the several views:

Figure 1 is a front side elevation of the embossing apparatus of the present invention.

Figure 2 is a top plan view thereof.

Figure 3 is a horizontal section through the apparatus taken on a plane substantially flush with the track rails, with the backing platform and tool pans removed, and showing certain depending parts of the platform in section.

Figure 4 is a detailed vertical section taken substantially on line 4—4 of Figure 3 and looking in the direction of the arrows.

Figure 5 is a sectional elevation of the hammer head of the apparatus taken substantially on line 5—5 of Figure 2.

Figures 6, 7, and 8 are sections taken substantially on the lines 6—6, 7—7, and 8—8 of Figure 5 and looking in the direction of the arrows.

Figure 9 is a vertical section taken substantially on the plane of the line 9—9 of Figure 7 and looking in the direction of the arrows.

Figure 10 is an exploded perspective view of the inner end of the handle shaft.

Figure 11 is a detailed vertical section substantially on the plane of line 11—11 of Figure 3.

Figure 12 is a perspective view of the backing platform indicating mechanism removed from the apparatus.

Figure 13 is a horizontal section taken substantially on the horizontal plane of line 13—13 of Figure 12.

Figure 14 is a fragmentary perspective view of a rear corner of the backing platform removed from the apparatus.

Figure 15 is a front elevation of the backing platform removed from the apparatus.

Figure 16 is a fragmentary elevation of the upper end of the standard partly in section and with parts removed.

Figure 17 is a section through the setting handle taken substantially on line 17—17 of Figure 16.

Figure 18 is a horizontal section taken substantially on line 18—18 of Figure 16.

Figure 19 is a fragmentary front elevation of the slide plate.

Figure 20 is a perspective view of the cam knob.

Figure 21 is a vertical section through a portion of the outside of the top frame of the table.

Figure 22 is a vertical sectional view through a work sheet embossed by the apparatus and removed from the clamping frame.

Figure 23 is a fragmentary vertical section through the clamping frame and work sheet prior to clamping the work sheet thereto.

Figures 24 and 25 are vertical sectional views

through hammer shanks removed from the chuck on the hammer rod.

Referring to the drawings in detail, the apparatus of the present invention includes a table

5 A preferably constructed of metal elements of sufficient strength to support the various parts of the apparatus. The top of the table is in the nature of an open rectangular frame with a relatively wide downwardly directed channel
10 piece as a rear side rail 30. The opposite ends of side rail 30 are secured to the rear ends of end rails 31, 32 and the forward ends of the end rails are secured to the front side rail 33 which latter is of channel shape. The legs 34 are secured at
15 the upper ends to the corners of the frame and support this top frame of the table in a comfortable elevated position for the operator and the legs are braced as at 35.

A pair of spaced transverse supporting bars 37,
20 38 are secured edgewise at their opposite ends to intermediate portions of side rails 30, 33. There is also a pair of parallel track rails 39, 40 secured by brackets 41 to the respective side rails 30, 33 and these track rails extend longitudinally and are coextensive in length with the top frame of
25 the table. A rectangular backing platform guide frame is removably supported and slidable longitudinally only on these guide rails and for this purpose the confronting faces of the track rails are formed with shoulders 43 between the upper
30 and lower edges on which rests the lower edges of the side rails 44 with intervening portions thereof sliding against the tracks above the shoulders all of which is shown in Figures 4 and 21. The guide frame 42 may be lifted from the track
35 rails but fits snugly between the rails when it is supported on the shoulders 43.

A rectangular horizontally disposed backing platform B moves vertically in the guide frame
40 42. This platform provides a buttress for the ductile metal work sheet to be embossed in relief by the apparatus as will appear later. Platform B is made with a rigid metal plate 45 on which is secured a compressible pad 46 preferably made
45 of rubber of the desired elasticity. Depending lugs 47 are secured to plate 45 and these lugs ride on lateral pins 48 secured to the rocker arms 49 which arms are rigidly connected to a pair of shafts 50, 51. The shafts 50, 51 are journaled in the supporting bars 37, 38. End portions of the
50 shafts at one end extend through support bar 38 and carry gears 52 on the projecting ends which mesh with worm gears 53 on the manually operated shaft 54. Operating shaft 54 is journaled in bearings 55 secured to support bar 38 and a bearing 56 secured to the front side rail 33 of the top frame of the table. The front end of shaft 54 extends forwardly from the track rail 40 and has an operating wheel 57 on the free end which
60 when turned in either direction raises or lowers the backing platform B. Shaft 54 extends transversely and shafts 50, 51 extend longitudinally of the top frame of the table. Lugs 47 are located adjacent the four corners of the platform B so as to raise and lower the platform in an even
65 horizontal plane. The inner end of a sectional rigid link arm C is rigidly secured to the lower ends of a pair of depending rods 58 by screws 59 which rods are secured to the metal plate 45 of the platform. Link arm C moves vertically with the platform and is connected with the indicator plunger as will hereafter appear. So as to insure that backing platform B moves in a vertical plane, in addition to the guide frame 42 there
70 is a bifurcated guide arm 220 secured to the metal

plate 45 in depending relation. The slot 221 in the arm straddles the center of shaft 51 and is guided thereby as will be seen by referring to Figure 3 of the drawings.

Bolted to the rear corner of the top frame of the table and to the ledge or rear side rail 39
5 is a supporting bracket 61 formed in the center with an upright bearing sleeve 62 and a socket 63 carrying a set screw 64. The lower end of a cylindrical vertical standard 65 is rigidly secured
10 in the socket 63 by the set screw 64. A vertically movable carriage including a sleeve 66 which carries the hammer head to presently appear, slides on standard 65 and the sleeve is formed with lateral vertically spaced apertured bearing lugs 67
15 and to these lugs are journaled on the pin 68 for swinging movement in a horizontal plane, a pair of ears 69 on the inner end of an arm 70.

The movement of carriage sleeve 66 is controlled with precision by a vertical rod 71 an intermediate portion of which slides through rear rail 30, see Figure 11, bearing 62 and a bearing 72 on the top wall of a square gear casing 73 which latter is secured under rail 30. In the bottom wall of the casing is an opening 74 registering with
25 bearing 72 through which slidably projects the threaded lower end 75 on the operating rod 71. The end of rod 71 which extends above the rail 30 is rigidly secured to the lowermost lug 67 on carriage sleeve 66 whereby vertical sliding
30 movement of the rod 71 moves arm 70. To operate rod 71 there is a manually turned shaft 76 extending transversely across the top frame of the table and this shaft has a wheel 77 on its free end which is turned by hand. The forward
35 portion of shaft 76 is journaled in a bracket 78 extending from one leg 34 diagonally to the forward side rail 33. The inner end of shaft 76 is journaled through the side wall of casing 73 in the bearing 79 and has a bevel gear 80 keyed
40 to rotate therewith inside the gear casing. This bevel gear 80 meshes with a beveled internally threaded gear 81 mounted on the threaded lower end 75 of the rod 71. Turning of gear 81 engaging threaded portion 75 causes rod 71 to move
45 up or down and thereby impart motion to the carriage sleeve 66 and arm 70 which carries the hammer head.

Fixed to the upper end of standard 65 is an oblong metal plate D which is disposed above
50 the limit of movement of carriage sleeve 66 and this plate is stationary during the operation of the machine. Plate D is formed with a rear sleeve 82 embracing the standard which is releasably locked to the standard 65 by any suitable means
55 such as a set screw 83. In the outer face of plate D is a vertical channel 84 which forms a guide for a sliding plate 108 and the movement of sliding plate 108 is translated through the parts about to be described to the gauge indicated generally at 89. Batten strips 85 are
60 secured to the plate D in shoulders 86 on each side of channel 84 and overlap the sliding plate 108. At each side of the plate D and on each side of channel 84 at about the center thereof are out-
65 set lateral lugs 86a and 86b and extending transversely across these lugs at right angles to channel 84 is a horizontal channel 86c which construction forms a pocket or space 86c between the
70 batten strips 85 and the faces of the lugs. At one side channel 86c registers with an aperture 87 in the rim 88 of the gauge housing indicated generally at 89, the latter formed in the shape of a drum and rigidly secured to the lug 86d to
75

project laterally. There is a sliding rack bar 90 in the transverse channel 86e having rack teeth 91 on the edge of the end thereof that projects into the gauge casing 89 through aperture 87.

The gauge housing 89 has a conventional glass panel 92 covering one face and a rear wall 93. There is a stationary partition wall 94 bridging the inside of the casing on the obverse face of which is a dial calibrated in equally spaced radial division lines 95 about the margin. As will appear later each division line indicates the movement of hammer head in a selected part of an inch, while at another time each division line will indicate an individual elevation or step in the contour of the map. A pointer shaft 96 is journaled respectively to the rear wall 93 and partition wall 94 and carries pointer 97 on the outer end which functions with the marginal division lines 95. On the shaft is anchored one end of a coil spring 98 which embraces the shaft and is arranged to resist movement of the shaft in a clockwise direction and this spring has the other end secured to a pin in the rear wall 93 of the gauge casing. There is a spur gear 99 on the pointer shaft 96 meshing with the teeth 91 on the rack bar 90 and linked as at 100 to the free end of the rack bar is a bowed leaf spring 101 secured to the rim 88 of the housing by rivets 102 which applies tension to the rack bar normally urging it inwardly. Spring 101 maintains the moving parts in tight fitted relation and absorbs any play between the setting handle and the rack bar.

Bolted to rotate freely as at 103 to the inside center of rack bar 90 and within the pocket 86c is a flat round knob 104 formed on a segment of its inner face with a right angled cam 105 which conformably embraces the lower portion of setting lever 106. The setting lever slides in cam 105 moving rack bar 90 distances in proportion to the angular position of the setting lever 106. The lower portion of lever 106 pivots on a pin 107 and this pin is eccentrically mounted in a disk 110 having a stem 111 rotatable in an opening in sliding plate 108 as will be seen by referring to Figures 18 and 19. It will be seen that disk 110 slides with the sliding plate 108 between the batten strips 85 and the setting lever 106 being pivoted to the disk also slides with the slide plate 108. The upper portion of slide plate 108 projects above the guide channel 84 and the plate D and on the free end is secured a lateral arcuate arm 112 which has a sliding fit with a right angles recess 113 on the inner face of a clamping plate 114 releasably secured in an inset shoulder 114' on the rear of the upper portion of setting lever 106. Clamping plate 114 serves to lock setting lever 106 at any selected angle on arm 112 by tightening the thumb screw 115 carried by setting lever 106 and the inner end of the screw threadedly engages the clamping plate 114 as at 116. The lower portion of sliding plate 108 projects below the channel 84 and engages the free end of a vertical pin 117 secured to the carriage sleeve 66. It follows then, that slide plate 108 moves in response to the hammer head as will be described later, and to keep slide plate 108 engaged with pin 117 a coil spring 118 is hooked at its upper end to a pin 119 on the slide and at its lower end hooked to a pin 120 on the carriage sleeve 66. To prevent dirt getting into channels 86e there are cover plates 121 secured over the channels and secured to the faces of the lugs with rack bar 90 sliding under these cover plates. It will be noted that when setting lever

106 is moved to the right or to the left the eccentric mounting thereof on pivot 107 will cause rack bar 90 to move in response to the movement of the lever. When setting lever 106 is made fast to the arm 112 the movement of slide plate 108 will also cause rack bar 90 to move as the cam 105 rides up and down on the setting lever.

On the upper end and laterally of the carriage sleeve 66 is secured by the bracket 122 an indicator block 123 formed with a vertical channel 124 in the outer face. In the channel slides an indicating plunger 125 and the outer face of the plunger is flush with the outer face of the indicator block. To one side of the recess is a blade 126 adjustable with respect to the block on screws 127 extending through slots 128 in the blade. There is an indicating line 129 on the blade, an indicating line 130 on the plunger, and an indicating line 131 on the outer face of the block which all coincide under the conditions and for the purposes hereafter appearing. Plunger 125 moves with backing platform D because it is connected to the upper end of a bolt 132 and this bolt is rigidly secured to the end of the rigid sectional link arm C.

On the outer end of arm 70 are a pair of spaced ears 133 between which is mounted for horizontal swinging movement a sleeve 134 on the inner end of a short arm 135 and a pin 136 extends through the sleeve and terminates in the ears. On the outer end of arm 135 is a spindle 135' which is journaled in a bearing 137 in an intermediate portion of the hammer head indicated generally at 138 which hammer head swings in a vertical plane. So that the hammer head will always have a working position in the same horizontal position there is an abutment lug 139 on the hammer head 138 which only bears on the arm 135 when the hammer head is in a horizontal plane. Lug 139 swings away from the arm 135 when it is desired to swing the hammer head on its pivot upwardly. Lug 139 limits the downward movement of the hammer head.

Hammer head 138 is an elongated arm with a goose neck portion 141 on its outer end that dips slightly below the plane of the arm. In the rear end of hammer head 138 is threaded as at 142 the inner end of a rod 143 on which slides the counter poise weight 144. The weight is formed with a central bore 145 to receive the rod and has a set screw 146 to lock the weight in adjusted position on the rod. An electric motor 147 is secured to a rearwardly projecting shelf 148' which shelf is stepped slightly above the plane of the arm. Adjacent the shelf and the rear portion of the hammer head is an upstanding bearing 148. On the goose neck is supported a floating bearing block 149. A short section of drive shaft 150 is journaled through bearing 148 while a short drive shaft section 151 is journaled through bearing block 149 and these short sections have universal couplings 152, 153 with the center drive shaft section 154. Inner end of section 150 carries a gear 155 which meshes with a driving pinion 156 on the motor shaft 157. Outer end of short section 151 has a crank 158 which has a connection by means of a pin 159 to the upper end of a pitman 160 that drives the hammer.

It is pointed out that bearing block 149 has a cylindrical depending sleeve 161 which extends through a vertical bore 162 and this bore is formed in the vertically spaced ears 163, 164 on the goose neck 141. The lower end of sleeve 161 has a threaded counter bore 165 to receive the

threaded upper end 166 of a bored guide nipple 167 which is locked to the sleeve by a nut 168. In the bore of sleeve 161 is a bearing bushing 169 the bore of which coincides with the bore in nipple 167 and an intermediate portion of the vertically reciprocating hammer rod 170 extends through the registering bores. On the upper end of hammer rod 170 are a pair of spaced apertured ears 171 connected by a wrist pin 172 to the lower apertured end of pitman 160. On the outer face of bearing block 149 is a hood 173 that swings on a pin 174 and this pin is carried by the bearing block 149. The hood covers crank 158, pitman 160 and upper end of hammer rod 170 and is locked in position on the lateral flange of sleeve 161 by the latch hook 175. Threadably secured to the free end of the hammer rod 170 is a chuck 176 in which is locked the shanks 177 carrying either a blunt rubber hammer block 178 as in Figure 25 or a rubber hammer point 179 as in Figure 24.

At certain times the hammer will jump or vibrate due to improper tension on the work sheet. Such vibration will spoil the contour being embossed. So as to offer a quick remedy for raising the hammer to overcome the vibration without raising the entire hammer head 138 the bearing block 149 and sleeve 161 are made in a floating construction. There is provided a cam action by merely turning the handle indicated generally at 180. Between the ears and encircling the center of depending sleeve 161 is a snug fitting collar 181 formed with a lateral lug 182 having a horizontal bore 183 registering with a narrow annular groove 184 on the surface of sleeve 161. In the inner end of bore 183 is a crank 185 having an eccentric pin 186 on which is mounted an arcuate lug 187 that rides in the groove 184 and this crank is fixed to a spindle 188 keyed to rotate with handle 180. The spindle 188 extends through a bushing 189 rigidly secured in the outer portion of bore 183. Thus when handle 180 is turned by the operator the crank will lower the sleeve 161 from retracted position and that is why the universal couplings 152 and 153 are necessary in the drive shaft.

Normally the sleeve 161 is retained in retracted relation by a pair of coil springs 190, 191 between the confronting faces of the bearing block 149 and the goose neck 141. One end of each spring conformably seats in a cavity 192 on the bearing block and the other end conformably seats in a cavity 193 on the goose neck 141. The lower ends of a pair of pins 194 are rigidly anchored in the goose neck 141 and rise therefrom. These pins have threaded portions 195 extending through smooth apertures in a flange 196 on the inside lower edge of bearing block 149 and projecting threaded portions 195 carry nuts 197 to adjust the tension on the springs 191 and also limit the retraction of the bearing block. When handle 180 is turned it moves the sleeve 161 against the tension of springs 191 and pins 194 keep the parts in proper alignment.

A work sheet 198 formed of ductile metal such as aluminum or copper of suitable gauge is carried by a rigid rectangular clamping frame E and the work sheet bridges the guide frame 42 in which the backing platform B operates. The frame E may be adjusted to vary the tension on the work sheet 198 which is embossed by the rubber pulsating hammers 179 or 178. Where there are narrow spaces between contour boundaries the point is used, while where there are wide spaces between boundaries the flat block

may be used. The frame E consists of four flat metal strips rigidly connected together in rectangular configuration which strips make the end rails 199 and side rails 200 of the frame. The frame is removably supported on lugs 201 extending around the guide frame 42. There are four inner gripping jaws 202 supported on the upper faces of the rails of the frame E and at spaced intervals each jaw is formed with upstanding bosses 203 having threaded horizontal bores 204 therein which register with smooth bores 205 on companion bosses 206 spaced along the outer margins of the rails of the frame E. Machine screws extend through the registering bores 204, 205 and by these screws tension on the work sheet 198 is regulated. The inner gripping jaws have flat faces and in the inner margins each are formed with a groove 208 coextensive with their lengths. At spaced points the inner gripping jaws have upstanding bolts 209 anchored therein and positioned outwardly of the grooves 208. There are four outer gripping jaws 210 overlying the inner gripping jaws which are formed with marginal slots 211 registering with the upstanding bolts 209 on the inner gripping jaws. These gripping jaws are flat strips and have tongues 212 on the inner faces thereof which clamp the margins of the work sheet 198 between said tongues and the grooves 208 with which they register. Nuts 213 on the bolts 209 hold the outer gripping jaws in clamped relation to the inner gripping jaws with the working sheet 198 therebetween. For holding tools there are a pair of pans 222 which rest on the shoulders 43 of the tracks 39, 40 one to each side of the frame 42.

Prior to placing work sheet 198 in the frame E it is provided on one face with lines 214 to represent the boundaries of the elevations to be embossed on the map. With face bearing the boundary lines upward it is clamped in frame E and placed on guide frame 42. Platform B is then elevated until the compressible mat 46 touches work sheet 198 in which position indicating lines 129, 130, 131 coincide. Referring to Figure 2 by way of example there are nine boundary lines each representing elevations of one hundred feet. The completed contour map will then have nine different elevations embossed thereon with each elevation of one hundred feet being on a different plane in relief. The embossing is done in a downward direction in accordance with the method referred to in the aforesaid patent and will have an appearance when finished similar to that shown in Figure 22 of the drawings.

For practical purposes the machine illustrated has been calibrated to the scale divisions 95 representing one-tenth of an inch. With the edge of setting lever 106 set to coincide with indicating line 215 on arm 112 the machine is calibrated to make pointer 97 read zero at which position hammer point is flush with the flat work sheet 198. Setting lever 106 is then locked coinciding with line 215, and wheel 77 is turned until pointer moves clockwise to coincide with the depth of the highest elevation. By way of example assume that the metal work sheet will withstand embossing to a depth of five-tenths of an inch. Then wheel 77 is stopped when pointer coincides with the fifth division on the scale. In this operation hammer point has been moved downwardly five-tenths of an inch. There are to be nine elevations on the finished work sheet and it follows that five-tenths of an inch is to be divided into nine equal parts each part representing an elevation from sea level to the highest elevation of nine hundred feet.

Now the mechanism of the present invention will automatically divide the depth of five-tenths of an inch into nine equal parts by changing the angle of setting lever 106 from zero line 215 to a point on arm 112 where the pointer coincides with the ninth scale division on the dial. In moving the setting lever to the left this movement is translated through knob 104 to rack bar 90 thereby moving the pointer by the eccentric action heretofore described. Setting lever 106 is then locked to bar 112 by screws 115 at the angle which corresponds to the ninth scale division on the dial. In the meantime hammer head 138 has not moved from the first adjustment which was set at five-tenths of an inch.

The hammer head 138 is then turned upwardly until pointer returns to the zero mark on the dial. Then the hammer head is run down until the pointer coincides with the first scale division. In doing this indicator line 130 on plunger 125 will be above lines 129 and 131 the exact distance the hammer head moves in moving pointer one scale division. Now so as to have the compressible mat in the plane of depth of the first embossing step to provide a backing all that is necessary is to turn wheel 57 until line 130 again coincides with lines 129, and 131.

After the parts are set the work sheet is hammered by the pulsating hammer point or block in the area bounded by the first elevation, that is around the margin of the work sheet and out as far as the first elevation boundary line representing one hundred feet of elevation. After the first elevation is embossed then wheel 77 is turned until pointer coincides with the second scale division. After doing this platform B is then lowered until line 130 coincides with lines 129 and 131 to compensate for moving the hammer head 138 one scale division on the dial.

The reason why shifting of the setting lever 106 automatically divides the total depth of the impressions into equal parts is because the machine calibrated to the zero line such as 215 on the bar 112 there is a positive angle of the lever engaging the cam 105 on the rack bar 90. As hammer head moves up and down this angle is unchanged and the teeth 91 on rack bar and teeth on worm gear 99 will move the dial one division every time the hammer head goes up or down one tenth of an inch. As hammer head 138 moves up or down cam 105 rides on the setting lever 106 which moves with slide plate 108, and as a result rack bar is moved horizontally. When the angle of setting lever 106 is changed from the zero mark 215 for dividing the total depth, the movement of rack bar in proportion to the movement of the hammer head is changed and the change in the angle will cause rack bar 90 to move a greater distance in the set position than when the setting lever 106 was in the zero position.

It will be obvious that the hammer block or point will always be moved by handle 180 to the same level for embossing work. By turning crank 185 on the handle, sleeve 161 is moved downwardly until the flange 196 and the other bottom parts of bearing block 149 abut the upper face of goose neck 141, at which point the handle 180 and crank 185 cannot be turned further. So that crank 185 cannot be turned past its lowest point, which would result in sleeve 161 being retracted, the distance the crank may be turned is regulated by moving the nuts 197 in or out on the threaded portion of the screws 194. While embossing the work sheet the operator always main-

tains the sleeve 161 in the projected position with the flange 196 abutting the goose neck 141 by holding the handle in the turned position by the strength of his hand.

Having thus described the invention, what is claimed as new is:

1. An embossing apparatus comprising, a stationary support, a pulsating hammer, a hammer mounting structure connected with the hammer and carried by the support, means mounted on the support for moving the hammer mounting structure with respect to the support, and a gauge associated with the hammer mounting structure for registering the movement of the hammer.

2. An embossing apparatus comprising, a stationary support, a pulsating hammer, a hammer mounting structure connected with the hammer and carried by the support, means mounted on the support for moving the hammer mounting structure with respect to the support, a gauge associated with the hammer mounting structure for registering the movement of the hammer, and a backing platform movably connected with the support.

3. An embossing apparatus comprising, a stationary support, a pulsating hammer, a hammer mounting structure connected with the hammer and carried by the support, means mounted on the support for moving the hammer mounting structure with respect to the support, a gauge associated with the hammer mounting structure for registering the movement of the hammer, a backing platform movably connected with the support, and means carried by the support for moving the platform.

4. An embossing apparatus comprising, a stationary support, a pulsating hammer, a hammer mounting structure connected with the hammer and carried by the support, means mounted on the support for moving the hammer mounting structure with respect to the support, a gauge associated with the hammer mounting structure for registering the movement of the hammer, a backing platform movably connected with the support, means carried by the support for moving the platform, and an indicator carried by the hammer mounting structure and connected with the backing platform to indicate the relation of the position of the backing platform with respect to the hammer.

5. An embossing apparatus comprising, a stationary support, a pulsating hammer, a hammer mounting structure connected with the hammer and carried by the support, means mounted on the support for moving the hammer mounting structure with respect to the support, a gauge associated with the hammer mounting structure for registering the movement of the hammer, a backing platform movably connected with the support, means carried by the support for moving the platform, an indicator carried by the hammer mounting structure and connected with the backing platform to indicate the relation of the position of the backing platform with respect to the hammer, and a frame movably supported on the support adapted to hold a work sheet being operated upon by the apparatus under the hammer.

6. An embossing apparatus comprising, a stationary support, a pulsating hammer, a hammer mounting structure connected with the hammer and carried by the support, means mounted on the support for moving the hammer mounting structure with respect to the support, a gauge

associated with the hammer mounting structure for registering the movement of the hammer, a backing platform movably connected with the support, means carried by the support for moving the platform, an indicator carried by the hammer mounting structure and connected with the backing platform to indicate the relation of the position of the backing platform with respect to the hammer, a frame movably supported on the support adapted to hold a work sheet being operated upon by the apparatus under the hammer, clamping means carried by the frame whereby the margins of the work sheet are held in clamped relation to the frame, and means carried by the frame and engaging said clamping means for adjusting the lateral tension on the work sheet.

7. An embossing apparatus, and in combination, a base, a standard rising from the base, a pulsating hammer, a hammer mounting structure connected with the hammer and movably supported by the standard, means carried by the base and engageable with the hammer mounting structure for moving the hammer, and a gauge mounted on the standard and engageable with the hammer mounting structure for registering the movement of the hammer.

8. An embossing apparatus comprising a table, a standard rising from the table, a jointed carriage movably mounted on the standard, a power driven reciprocating hammer supported on the jointed carriage, means carried by the table and engageable with the carriage for moving the carriage, and a gauge carried by the standard and engageable with the carriage for registering the movement of the carriage.

9. An embossing apparatus comprising a table, a standard rising from the table, a jointed carriage movably mounted on the standard, a power driven reciprocating hammer supported on the jointed carriage, means carried by the table and engageable with the carriage for moving the carriage, a gauge carried by the standard and engageable with the carriage for registering the movement of the carriage, and a backing platform movably supported by the table.

10. An embossing apparatus comprising a table, a standard rising from the table, a jointed carriage movably mounted on the standard, a power driven reciprocating hammer supported on the jointed carriage, means carried by the table and engageable with the carriage for moving the carriage, a gauge carried by the standard and engageable with the carriage for registering the movement of the carriage, a backing platform movably supported by the table, and means carried by the table for moving the backing platform.

11. An embossing apparatus comprising a table, a standard rising from the table, a jointed carriage movably mounted on the standard, a power driven reciprocating hammer supported on the jointed carriage, means carried by the table and engageable with the carriage for moving the carriage, a gauge carried by the standard and engageable with the carriage for registering the movement of the carriage, a backing platform movably supported by the table, means carried by the table for moving the backing platform, and an indicator carried by the carriage and connected with the backing platform to indicate the relation of the position of the backing platform with respect to the hammer.

12. An embossing apparatus comprising a table, a standard rising from the table, a jointed carriage movably mounted on the standard, a power driven reciprocating hammer supported on the

jointed carriage, means carried by the table and engageable with the carriage for moving the carriage, a gauge carried by the standard and engageable with the carriage for registering the movement of the carriage, a backing platform movably supported by the table, means carried by the table for moving the backing platform, an indicator carried by the carriage and connected with the backing platform to indicate the relation of the position of the backing platform with respect to the hammer, and a frame supported on the table above the backing platform adapted to hold a work sheet being operated upon by the apparatus under the hammer.

13. An embossing apparatus comprising a table, a standard rising from the table, a jointed carriage movably mounted on the standard, a power driven reciprocating hammer supported on the jointed carriage, means carried by the table and engageable with the carriage for moving the carriage, a gauge carried by the standard and engageable with the carriage for registering the movement of the carriage, a backing platform movably supported by the table, means carried by the table for moving the backing platform, an indicator carried by the carriage and connected with the backing platform to indicate the relation of the position of the backing platform with respect to the hammer, a frame supported on the table above the backing platform adapted to hold a work sheet being operated upon by the apparatus under the hammer, clamping means carried by the frame for gripping the margins of the work sheet, and means carried by the frame and engaging the clamping means for adjusting the lateral tension on the work sheet.

14. An embossing apparatus, and in combination, a stationary base, a standard carried by the base, a carriage movably mounted on the standard, a reciprocating hammer, means for slidably supporting the hammer on the carriage, a power driven shaft journaled to the carriage and connected to the hammer, and means engageable with the first mentioned means for bodily moving a portion of the drive shaft and journal and the hammer.

15. An embossing apparatus, and in combination, a base, a standard rising from the base, a carriage slidable on the standard, a hammer head having a universal connection with the carriage, a hammer rod having a slidable bearing connection with the head, a drive shaft journaled to the hammer head, and means coupled to the slidable bearing connection for moving the hammer rod and a portion of the drive shaft.

16. An embossing apparatus, and in combination, a base, a standard rising from the base, a carriage slidable on the standard, a hammer head having a swivel connection with the carriage, a power driven shaft having more than one journal connection with said head, a hammer rod, means for mounting the rod for reciprocation on the head, said means and one of said journals joined to form a retractile unit, and means carried by the first mentioned means to urge the retractile unit to projected position.

17. An embossing apparatus, and in combination, a support, a pulsating hammer, a hammer mounting structure connected with the hammer and movable on the support, a backing platform movable on the support, a gauge on the support having variable engagement with the hammer mounting structure to register the movement of the hammer, and an indicator on the hammer mounting structure engageable with the back-

ing platform to indicate the position of the hammer relative to the platform.

18. An embossing apparatus, and in combination, a support, a pulsating hammer, a hammer mounting structure connected with the hammer and movable on the support, a backing platform movable on the support, a gauge on the support having variable engagement with the hammer mounting structure to register the movement of the hammer mounting structure, an indicator on the support engageable with the backing platform to indicate the position of the hammer relative to the platform, and means associated with the gauge to change the relation of the engagement with the hammer mounting structure.

19. An embossing apparatus, and in combination, a support, a pulsating hammer, a hammer mounting structure connected with the hammer and movable on the support, a backing platform movable on the support, a gauge on the support having variable engagement with the hammer mounting structure to register the movement of the hammer mounting structure, an indicator on the support engageable with the backing platform to indicate the position of the hammer relative to the platform, means associated with the gauge to change the relation of the engagement with the hammer mounting structure, and a work sheet support frame carried by the support and disposed between the backing platform and the plane of the hammer.

20. In combination with an embossing appa-

ratus including a pulsating hammer, a hammer mounting structure movable on a support of a gauge for registering in a constant proportion the movement of the hammer relative to the support, and means movable in response to the movement of the hammer mounting structure and coacting with the gauge to divide the constant proportion into predetermined parts.

21. In combination with an embossing apparatus including a support, a pulsating hammer mounting structure movable on the support, a work sheet supporting member carried by the support, and a movable backing platform connected with the support; of a gauge carried by the support and co-acting with the hammer mounting structure to register the movement thereof with respect to the support, and an indicator carried by the hammer mounting structure and connected with the backing platform to register the movement of the backing platform with relation to the hammer mounting structure.

22. In combination with an embossing apparatus including a support, a pulsating hammer mounting structure movable on the support, a work sheet supporting member carried by the support, and a movable backing platform connected with the support; of an indicator carried by the hammer mounting structure and connected with the backing platform to register the movement of the backing platform with relation to the hammer mounting structure.

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