J. B. ODELL.

TYPE SETTING MACHINE.

APPLICATION FILED SEPT. 11, 1908.

946,768.

Patented Jan. 18, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

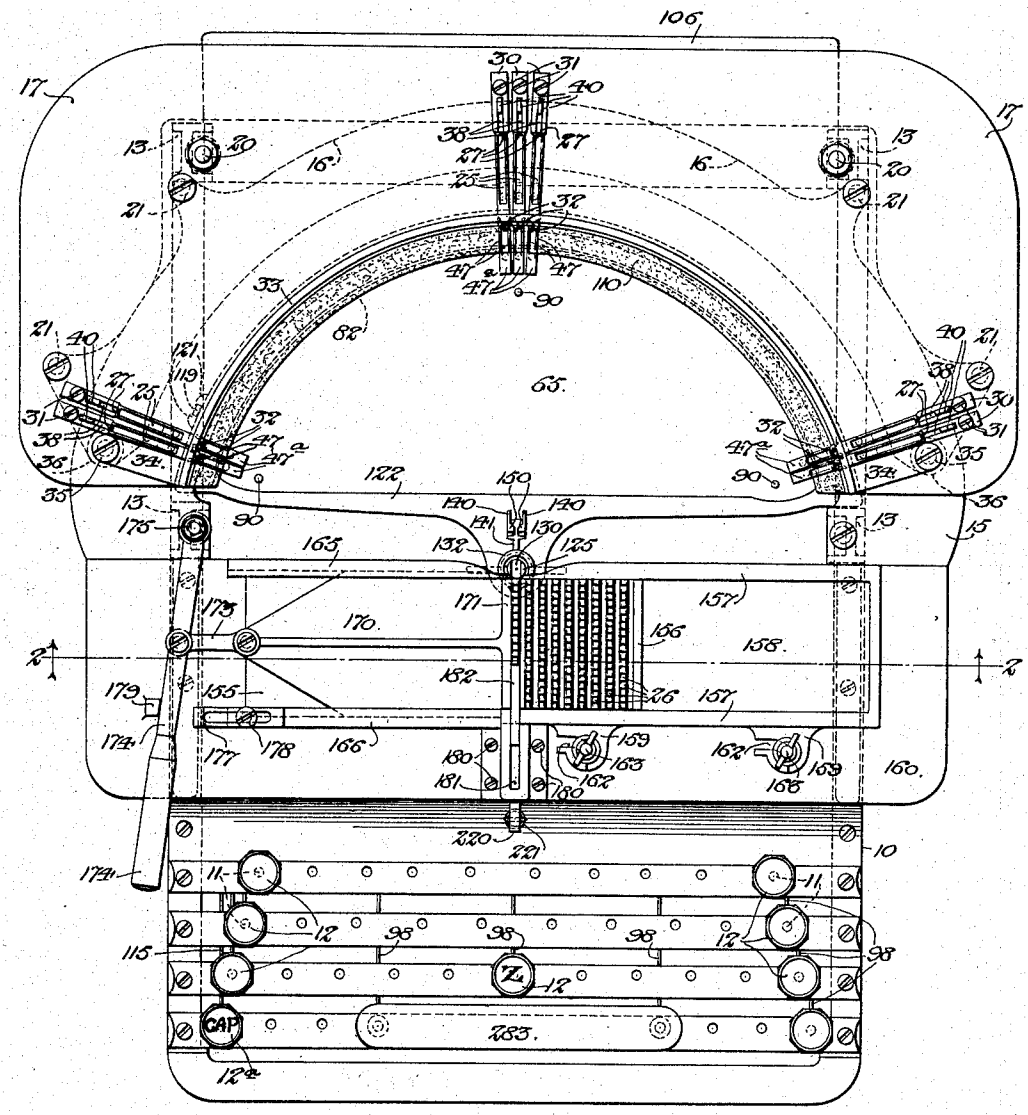
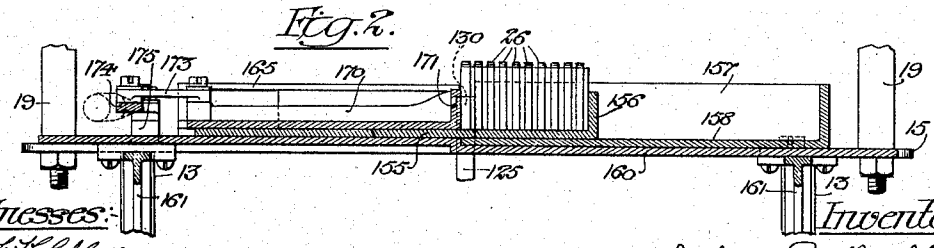


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 7.

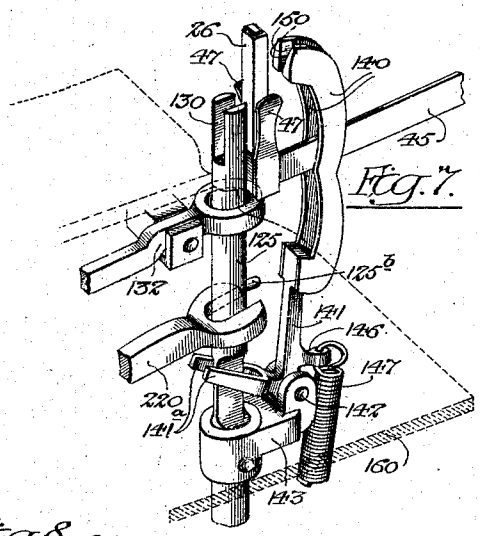

Fig. 5.

Fig. 8.

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3 SHEETS—SHEET 3.

Fig. 4.

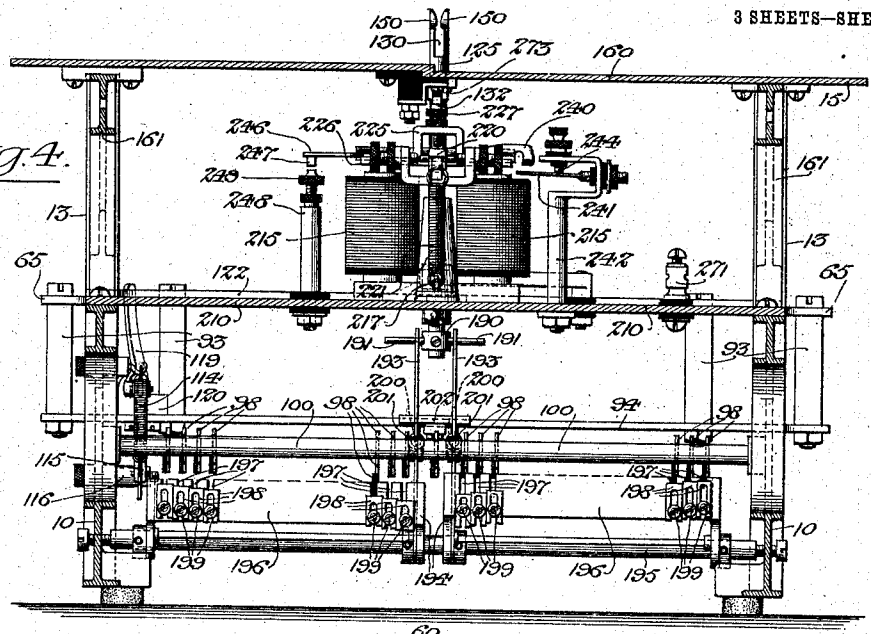


Fig. 5.

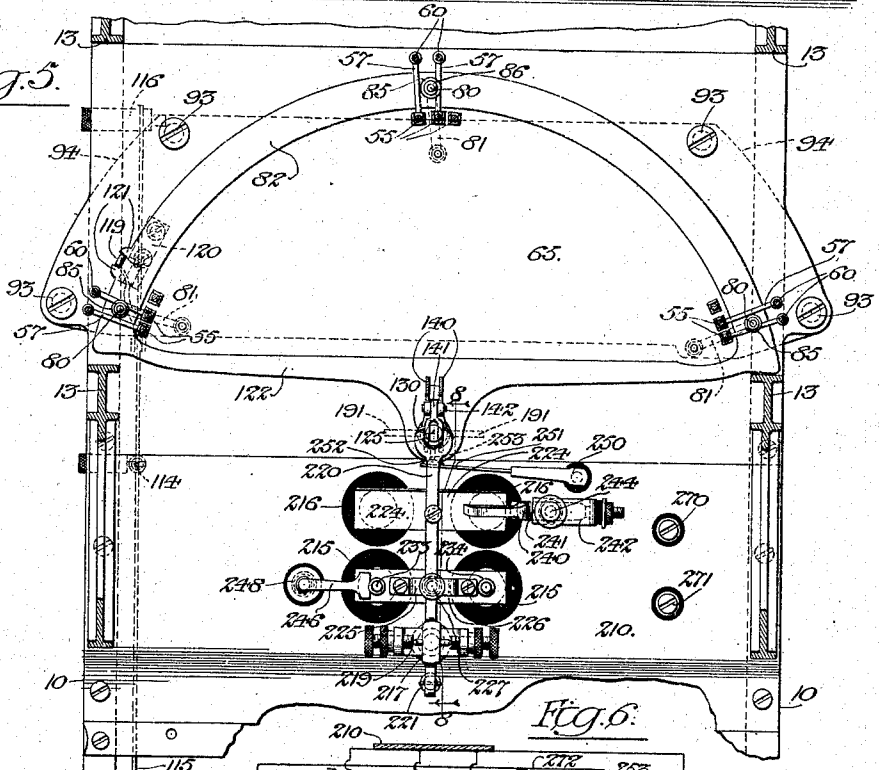
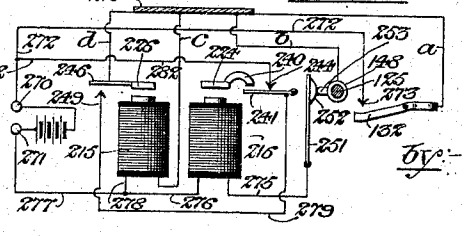


Fig. 6.



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UNITED STATES PATENT OFFICE.

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TYPE-SETTING MACHINE.

946,768. Specification of Letters Patent. Patented Jan. 18, 1910.

Application filed September 11, 1908. Serial No. 452,596.

To all whom it may concern:

Be it known that I, JOHN B. ODELL, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Type-Setting Machines, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

The present invention has for its object to provide simple and efficient means whereby type may be quickly and accurately set, and the invention consists in the features of novelty hereinafter described, illustrated in the accompanying drawings and more particularly pointed out in the claims at the end of this specification.

Figure 1 is a plan view of the machine embodying my invention, parts being omitted for the purpose of better illustration. Fig. 2 is a detail view in cross-section on line 2—2 of Fig. 1. Fig. 3 is a view of the machine in central vertical section. Fig. 4 is a view in vertical section on line 4—4 of Fig. 3. Fig. 5 is a view in horizontal section on line 5—5 of Fig. 3. Fig. 6 is a diagram of certain electric circuits. Fig. 7 is a detail perspective view. Fig. 8 is a detail section on line 8—8 of Fig. 5.

The main frame 10 of the machine is preferably of metal casting and is similar to the frames commonly employed in typewriting machines. At the front of the main frame 10 is formed a key-board, through which project upwardly the stems 11 of the several finger keys 12. These keys will preferably be arranged in manner corresponding to that now generally adopted for the so called "universal" key-board of typewriting machines. Upon the upwardly extending posts 13 at the back of the main frame, are sustained three horizontally disposed and parallel plates 15, 16 and 17, the inner edges of which are of approximately semi-circular outline. The plate 17 rests upon the upper ends of the front and rear end posts 19 and 20, and the plate 16 is shown as suspended by rods 21 from the plate 17.

Upon the top plate or segment 17 is concentrically grouped a series of vertically disposed compartments or cases 25 wherein the type 26 will be stacked. In the accompanying drawings I have shown only a few of the type compartments or cases 25, but it will be understood that they will be arranged in number corresponding with the different types (*i. e.*, letters, figures, punctuation marks, etc.,) to be set. Each of the type compartments or cases 25 is interiorly of approximately the dimensions of the type for which the case is adapted, and the rear edge of each case 25 is formed with a long slot 27 to permit a thin tool to be inserted into the slot in order to support a stack of type as it is lowered into the case to fill the same. The front wall of each type case or compartment 25 is formed with a cutaway space 28 at its lower end, through which space the type will be ejected one at a time in manner to be hereinafter described. As shown more particularly in Fig. 1 of the drawings, each of the type cases or compartments 25 is provided at its lower end with a rearwardly extending lug or projection 30 through which will pass a set screw 31, whereby the lower end of the type case is fixed to the plate 17 and the upper end of each type case or compartment is attached by a screw 32 to a bar 33 of semi-circular shape. This bar 33 has its front ends provided with laterally extending arms 34 that rest upon and are attached by means of screws 35 to posts 36 that rise from the plate or segment 17, such posts being practical continuations of the front posts 19 hereinbefore described.

Beneath each of the type cases or compartments 25 a slot 37 is formed in the plate 17 and each of the lugs or extensions 30 which projects rearwardly from the type cases is formed with a similar slot 38 in line with the slot 37. The upper end of a type pusher 40, (see Fig. 3) extends through each pair of slots 37 and 38, the purpose of which is to advance the lowermost type in the compartment into position to be grasped by the type carrier, as will presently more fully appear.

There will be a type carrier 45 for each of the different types or characters that appear upon the key-board of the machine, and the upper end of each of the type carriers is provided with a pair of spring jaws 47 having flaring ends to enable the jaws to more readily slip over and grasp the types. Each of the type carriers is pivoted at its lower end, as at 49, within a suitable hanger 50 corresponding in general construction and arrangement to the type bar hangers of a typewriting machine, these hangers being

attached as by screws 51 to the plate or segment 15 at the top of the main frame. Each pivoted type carrier has an offset lug or arm 54 to which is attached the upper end of a link 55, whereby the type carrier will be turned downward along the dotted line indicated in Fig. 3 of the drawings. The lower end of the link 55 is pivotally connected, as at 56, to one end of a cross-head 57 and through the opposite end of this cross-head 57 passes a rod 60, whereby the corresponding type pusher 40 will be operated. The rod 60 is preferably fixed to the cross-head 57 by means of a screw 61 and this rod 60 passes through guiding holes formed in the plate 15, and as well, also, in a plate 65 that extends from side to side of the main frame 10. At the upper end of each of the rods 60 is formed a long slotted coupling head 67, through which passes a short arm 68 of the corresponding pusher bar or lever 40 that is pivoted as at 69 to the arms of a hanger or journal bracket 70 that is fastened as by screws 71 to the plate or segment 16, (see Fig. 3). A coiled spring 74 encircles the rod 60 and bears against the collar 75 thereon, thus tending to lift the rod and the type carrier 45 and pusher 40 connected to the rod, normally to the position illustrated in Fig. 3 of the drawings. Each of the cross-heads 57 is shown, also, as provided with a guide rod 76, that passes through a hole formed in the top plate 65 of the main frame.

By reference more particularly to Fig. 3 of the drawings, it will be seen that between the cross-heads 57 there rises the vertical rods 80. Each of these rods is fixed at its lower end to a swinging arm 81 and passes upwardly through the plate 65, and also through a shift plate or segment 82 just above the plate 65. Each of the rods 80 has its upper portion screw threaded and provided with a thumb nut 85 and preferably a jam nut 86, the thumb nut being of such size that when the rod is in normal position it will overlap one or the other of the cross-heads 57 between which it rises. The purpose of the shifter plate 82 is to move the rods 80 laterally a short distance, so as to bring the thumb nut or offset 85 in position to actuate either one of the two adjacent cross-heads 57 between which the rod 80 is vertically movable. The top plate 65 is formed with a series of short curved slots (or if preferred, a single long slot), through which the rods 80 pass. Hence, it will be seen that when the shifter plate 82 is moved, (in manner to be presently described) the rods 80 can be shifted slightly in lateral direction, so that each rod will serve to actuate at different times two cross-heads 57. By this means a single set of key levers and finger keys may be employed for operating twice the number of type carriers just as in a typewriting machine, having a universal key-board, a single set of key levers is used for operating upper and lower case type, numerals, etc.

The bar 81 is shown as formed with a sleeve 89 through which passes a pull rod 90, the sleeve 89 being pivotally mounted upon the rod 90 so that the rear portion of the bar 81 may swing slightly when the shifter plate 82 is operated and each of the pull rods 90 is provided with fixed collars 91 and 92 between which the sleeve 89 is mounted. Each rod extends through guide openings in the plate 65 and in a plate 94 suspended from the plate 65 by posts 93, and encircling each of the rods 90, between its collar 91 and a cross-plate 94, is a coiled spring 95 that serves to normally force the pull rod 90 in upward direction. The lower end of each pull rod 90 is formed with a long opening through which passes the rear end of a bar 96 that forms one member of the compound key lever, and this bar 96 is pivoted, as at 97 to the other member 98 of the compound key lever. The front end of each bar 96 is formed with a slot 99 through which passes a transverse rod 100 that extends from side to side of the main frame of the machine, this rod 100 constituting a fulcrum for the bars 96. The rear end of each bar 98 has a screw threaded boss 104, through which passes an adjusting screw 105 adapted to contact with a cross-plate 106 that extends from side to side of the main frame at its rear and by the adjustment of the screws 105 the pivotal movement of the bars 98 can be accurately determined. The front end of each of the bars 98 is connected to its corresponding finger key stem 11 preferably by passing the end of the bar 98 through a slot formed in the stem 11.

From the construction of parts as thus far defined, it will be seen that when a finger key 12 is depressed, as, for example, the finger key designated by the letter *z* in Fig. 1, the front end of the bar 98 will be forced downward, this bar 98 at such time turning about the upper end of the adjusting screw 105 as a fulcrum. As the bar 98 is thus depressed, it will draw downward the bar 96, which at such time will rock about the rod 100 as a fulcrum, and the rear end of the bar 96 will in turn draw down the pull rod 90 against the force of the spring 95 and will cause the bar 81 and rod 82 to pull down the cross-head 57. As the cross-head 57 is thus pulled downward, the rod or link 55 will cause the corresponding type carrier 45 to swing downwardly and forwardly in order to carry the lowermost type in the corresponding compartment to the front of the machine in position to be set. It will be seen that the long slot in the head or coupling 67, through which the short arm 68 of the pusher bar 40 passes, allows considerable

lost motion to the rod 60 before the pusher bar 40 is actuated to advance the next type from the corresponding compartment or case 25, the purpose of this lost motion connection between the cross-head 57 and the pusher bar being to enable the type carrier 45 to withdraw the lowermost type from the compartment or case 25 before the pusher bar moves, so that the next type may drop into the path of the pusher bar and be advanced thereby in position to be engaged by the type carrier when the latter is returned to normal position. When the key lever has completed its downward stroke, and the pressure of the operator's finger is released therefrom, the springs 95 and 74 will restore the parts to the normal position shown in Fig. 3 of the drawings.

By reference to Figs. 1 and 3 it will be seen that the segment 17 has its front semi-circular edge depressed to receive a semi-circular strip 110 of leather or like material, over which the type 26 will be successively advanced by the pusher bars 40, and against which, also, the upper ends of the type carriers will contact and rest when said carriers are in normal position. By forming the key levers as compound levers, it will be seen that a comparatively slight depression of the front end of each key lever bar 98 will effect a materially increased movement of the rear end of the companion bar 96, thereby insuring the required extended movement for actuating the type carriers 45 and pusher bars 40.

The mechanism, whereby a single finger key and key lever is enabled to actuate two type carriers and pusher bars, will next be described.

By reference to Figs. 3 and 5 of the drawings it will be seen that the finger key 12^a at the extreme left hand side of the key-board is designated as the "cap" key, and to the stem 11 of this finger key 12^a is connected the forward end of a shifting lever 115, the rear end of which lever is pivoted, as at 116, to a stud or rod projecting inwardly from the left hand side of the main frame of the machine. To this lever 115, which is upheld by a spring 114, is pivotally connected, the lower end of a link 117, the upper yoke-shaped end of which is pivoted as at 118, to one arm of a bell-crank lever 119. This bell-crank lever 119 is pivotally mounted on a bracket 120 secured to the transverse plate 94 of the machine and the upper end of the lever 119 extends through the top plate 65 and between two lugs 121 formed on the semicircular shifting bar 82 adjacent one end. The forward ends of this shifting bar 82 are shown as connected together by a transverse bar 122 (see Fig. 5), having a front extension through which passes a post 125 whereon the plate 82 oscillates slightly as a center. It will thus be seen that when the cap key 12^a is depressed, the forward arm of the elbow lever 119 will be drawn downward and the upper arm of this elbow lever will cause the shifting plate or bar 82 to oscillate slightly, and in so doing it moves each of the pull rods 80 a sufficient distance to cause its thumb nut or projection 85 to pass from above one of the cross-heads 57 to a position above the next adjacent cross-head. It is apparent therefore, that if, while the cap key 12^a is thus held down by the operator one of the finger keys 12 should be depressed, the pull rod 80 corresponding to and connected with such finger key will operate to depress a different cross-head 57 and, hence, actuate a different type carrier 45 and push bar 40 from that actuated when its thumb nut 85 is in normal position over the adjacent cross-head. Two adjacent cross-heads 57 (as for example, those controlling the type carriers of the letters "A" and "a") can thus be readily actuated by a single key lever, and the machine may thus be made much smaller and more compact, and with fewer parts than would be necessary if a single key lever and connections were required for each type. As shown in Fig. 3, the type carrier arms 45 are all of the same length, but the pivots 49 of adjacent carriers are staggered or at different heights so that the type carriers and compartment may be compactly arranged, but the ends of the type carriers will not collide during rapid operation, since they are correspondingly staggered in normal position. The bottoms of the type cases 25 will be arranged to hold the lowermost type therein in proper position to be engaged by the staggered type carriers, and the push bars 40 are of different lengths, as shown, to properly advance the lowermost type in the manner described. As each type carrier 45 returns to the normal position shown in Fig. 3, its spring jaws 47 embrace the lowermost type that has been advanced from a corresponding case or compartment 25 by the push bar 40, and the base of such type rests upon the part 47^a that extends between and connects the jaws 47, and when a type carrier 45 is swung forwardly and downwardly, as hereinbefore described, the type carried thereby is presented in line with a receiving slot 130 formed at the upper end of the alining rod 125, the lower end of the type being in line with the base of the slot. The forward and downward movement of each type carrier 45 is limited by contact with the rear end of a switch lever 132 that has a hole in its rear end, through which the rod 125 passes loosely. In its forward and downward movement, the type carrier 45 passes between the upper ends of spring jaws 140 that are fixed to the upper end of an elbow lever 141. This lever 141 is pivoted as at 142 to an arm 143 fixed on the rod

125. From the elbow lever 141 projects a lug 146 to which is connected the upper end of a coiled spring 147, the lower end of this coiled spring being secured to a collar 148 fixed to the rod 125. By reference to Figs. 4 and 7, it will be seen that upwardly and outwardly beveled cams 150 are formed upon the inner faces of the spring jaws 140, so that as the type carrier 45 descends it may readily pass between and slightly spread these jaws, but when the type carrier reaches the limit of its forward and downward movement the jaws 47 of the type carrier are slightly below the bottoms of the cams 150 of the spring jaws 140, while the type supported by the jaws 47 extends above these jaws and in position to be engaged by the cams 150, when the spring jaws 140 are forced forward by the rocking of the lever 141, in manner to be presently described.

Provision is made for giving a two-step movement to the lever 141 and to the jaws 140, so that these jaws 140 (when a type carrier has brought a type to position in front of them), shall first push the type from between the spring jaws 47 of the type carrier and into the slot 130 of the rod 125, and shall thereafter push the type forwardly out of the slot 130 on to the floor of a composing "stick" 155 comprising a bottom plate and having one upturned end 156, and its upturned end set between the side walls 157 of a galley 158 that rests upon a table 160 at the front of the machine. This table 160 is shown as supported by brackets 161 that project forwardly from the front standards 13 of the main frame. By reference to Fig. 2 it will be seen that the table 160 has a depressed portion to receive the bottom of the galley 158. The front side 157 of the galley 158 (see Fig. 1) is provided with offset lugs 159 through the slots 162 of which extend the set screws 163 whereby the galley is retained in position upon the table 160. Upon the table 160 are mounted the guide rails 165 and 166, these rails having flanged inner faces between which is mounted, in manner free to slide, a feed plunger 170 the inner end of which 171 is equal in length to the width between the walls of the galley 158 and serves to maintain the type in upright position as they are successively set within the galley. At the outer end of the feed plunger 170 is pivotally secured a link 173 to which is connected a hand lever 174, that is pivoted as at 175 to a stud on the main frame. To the guide rail 166 is adjustably connected a slotted plate 177 through the slot of which passes an adjusting screw 178 that enters a threaded perforation in the rail 166. This slotted plate 177 has a depending outer end adapted to limit the inward movement of the hand lever 174, the movement of this hand lever in opposite direction being limited as by a vertical stud 179. By adjusting the plate 177 the throw of the hand lever 174 can be accurately regulated so that this hand lever shall move the feed plunger the proper distance at each stroke to advance the mass of type the extent of the width in one line. Upon the front of the table 160 and at a point directly opposite the pivoted post 125 is secured, as by screws 180, a channel 181, adapted to receive a slug 182 corresponding in width to the type that is being set in the machine. By reference to Fig. 1 of the drawings it will be seen that, as the type are successively pushed from the slot 130 at the upper end of the rod 125, the slug 182 will be pushed outwardly into the channel 181, and when the slug 182 reaches the front end of the channel 181 the type will be in line with the front wall 157 of the galley 158. The operator may then move toward the center of the machine, the hand lever 174 so as to advance the row of type last set into the galley, and then by retracting the hand lever in position shown by full line in Fig. 2, a space is formed within which a new line of type may be set, and the slug 182 will be pushed rearwardly out of the channel 181 to a point adjacent the slot 130 of the post 125.

By reference to Fig. 7 of the drawings, it will be seen that the spring arms 140 at the top of the lever 141, have their upper ends curved forwardly, so that after the lever 141 has been rocked about its pivot point and has thereby moved the type from the jaws 47 of a type carrier 45, the jaws 47 of the type carrier can swing upward between the arms 140 and at the rear of the cams 150, as the cams 150 hold the jaws 140 sufficiently wide apart to permit such upward movement of the type carrier.

Before describing in detail the mechanism whereby the type are pushed into the galley 158 from the slot 130 of the pivoted alining rod 125, I will describe the mechanism whereby the alining rod 125 is shifted so as to receive the type from the various compartments or cases 25 that are arranged in semi-circular manner (see Fig. 1) around the top of the machine. The alining rod 125 stands normally in the position shown in Figs. 1 and 3 of the drawings, that is to say, with its slot 130 facing directly toward the front and rear of the machine. In order to enable a type ejected from one of the compartments 25 at the sides of the machine to be pushed into the slot 130 of the alining rod 125, it is necessary that the alining rod be turned so as to bring the slot 130 opposite a type carrier that has delivered a type from one of said side compartments. For this purpose, the rod is rotatably mounted in an opening in the forward edge of the plate 65, and is held in position by the collar

148 above the plate and a collar 148 fixed to the rod below the plate. To the lower end of the alining rod 125 is fixed a collar 190 from opposite sides of which project arms 191 (see Fig. 4). Each of the arms 191 extends through a slot 192 formed at the upper end of a shifter bar 193 fixed to a shifter frame 194, that is pivotally mounted upon a shaft 195 extending from side to side of the main frame. As shown, there are two shifter frames 194, and the front bars 196 of these shifter frames extend beneath groups of key levers at opposite sides of the machine, as shown in Fig. 4 of the drawings. The upper edge of each of the front bars 196 of the shifter frames is formed with a series of vertical slots 197, and opposite these slots 197 are adjustably mounted the stops 198, the position of which determines the degree of depression that may be given to the shifter frame 194 by the key levers 98. Each of the stops 198 is formed with a slot through which passes a set screw 199 that enters a threaded hole in the front bar 196 of the shifter frame. Coiled springs 200 (see Fig. 3), are connected at their front ends to the shifter bars 193, the opposite ends of these coiled springs being fixed to the eyes of pins 201 that depend from the transverse plate 94. These coiled springs 200 serve to hold the shifter frames 194 in the normal position with the arms 193 held against a stop bar 202 that is fixed to the plate 94 and projects forwardly therefrom. The arms also engage the pins 191 and hold the alining rod 125 accurately in central position, but yieldingly, so that it may be turned in opposite directions from normal, when keys on one or the other side of the machine are operated to move one or the other shifter frame 194. The lost motion between the arms 193 and the pins 191, permits the shift of the rod 125 by either arm without moving the other arm. The return movement of either arm is arrested by the stop bar 202, and, whichever way the alining rod 125 is moved it will be returned and accurately arrested in normal, central position. It will thus be seen that when a key lever (other than the central key levers of the machine) is depressed, it will cause the corresponding shifter frame 194 beneath it to rock about the shaft 195, thereby causing the shifter bar 193 to engage one of the arms 191 at the lower end of the alining rod 125, and to turn this rod 125 to an extent corresponding to the depression that has been imparted to the shifter frame 194 by the key lever 98. This turning of the alining rod 125 will cause the slot 130 at its upper end to be brought substantially parallel with the type case or compartment 25 corresponding to the key lever 98 that has been depressed. Hence, it will be seen that this depression of the key lever will bring the alining rod 125 in proper position to receive the type from the type carrier 45 corresponding to the key lever 98 that has been operated.

It will be understood that the key levers which operate type carriers pivoted at the extreme sides of the machine will impart the greatest degree of rotation in opposite directions to the alining rod 125, while the key levers operating type carriers pivoted nearer to the center of the machine will impart a less degree of rotation to the alining rod. When the alining rod has been rotated in manner just described by the operation of a key lever, and a type carrier has been actuated so that its spring jaws 47 present a type opposite the slot 130 of the alining rod 125, the jaws 140, which turn with the rod, will be actuated (by means to be presently described), so as to cause the cams 150 at the upper ends of the jaws 140 to push the type from the spring jaws 47 into the slot 130 of the alining rod. The type carrier will then return to normal position and, pressure upon the key lever 98 being released, the coiled spring 200 will restore the shifter frame 194 to the normal position seen in Fig. 3 of the drawings, and when a shifter frame 194 is thus restored to normal position, the slot 130 at the top of the alining rod will be in position to deliver the type into the galley 158. A further movement of the jaws 140 will then serve to push the type from the slot 130 of the alining rod into the galley 158 after the alining rod has returned to normal position. In the drawing, all of the key levers 98 except a single central key lever, are arranged to engage one or the other of the shifter frames 194 and turn the alining rod 125. In practice three or more of the central key levers could be arranged so as to operate without turning the rod, since the jaws 140 that are connected to the rod serve as a centering device for the type carriers. When such a central key lever is operated, a full movement will be imparted to the jaws 140, so that the type will be at once shifted through the slot 130 of the alining rod and into the galley.

The mechanism whereby the type are forced from the type carriers into the slot 130 of the alining rod and from said slot 130 into the galley 158, is mounted on a metallic base plate 210, arranged above the key-board of the machine, (see Figs. 3, 4 and 5) and carrying electromagnets 215 and 216, the magnet 215 being designated, for convenience, the primary magnet and the magnet 216 being designated the secondary magnet. A hollow post 217 rising from the plate 210 has adjustably connected thereto, as by a set screw 218, a rod 219 that enters the post 217, and the yoke-shaped upper end of this rod 219 serves to pivotally support the armature lever 220. The rear end of the lever 220 is yoke-shaped and straddles the alining rod

125, and is arranged above the yoke-shaped end 141ª of the elbow lever 141 which straddles a cutaway portion of the rod 125 and is held against a shoulder 125ª thereon by the spring 147. This shoulder thus serves as a stop to limit the backward movement of the lever 141 and the jaws 140 connected thereto. A stop pin 125ᵇ on the rod limits the forward movement of these parts. The forward end of the armature lever 220 has a coiled spring 221 connected thereto, the lower end of this spring being attached to a pin 222 that projects forwardly from the base of the post 217. The pivoted lever 220 has fixed adjacent its rear end, the armature 224 of the secondary magnet 216 and the lever 220 passes through a bridge 225 that is fixed to and rises above the armature 226 of the primary magnet 215. An adjusting screw 227 passes through the crown of the bridge 225 and controls the initial downward movement of the lever 220. As shown, the lower edge of the lever 220 is cut away as at 228 where the lever passes above the armature 226, so that the movement of the lever 220 might be continued after the armature 226 has completed its downward movement to shifted position. To the under side of the armature 226 and centrally between the coils of magnet 216 is fixed a depending rod 230 that enters a socket 231 rising from the base plate 210, and on this rod 230 is mounted the coiled spring 232 which serves to normally force upward the armature 226. This armature is guided to shift vertically on pins 233 fixed to the cores of the magnet 215 and stops 234 on these pins limit the upward movement of the armature, and the screw 227 connected to the armature limits the upward movement of the armature lever 220. When the primary magnet is engaged it will initially shift the armature lever 220 and the latter will throw the angle lever 141 and jaws 150 far enough to move the type from its carrier into the slot 130 of the alining rod 125. The initial shift of the parts is limited by the engagement of the armature 226 with the poles of the magnet 215, but the one-way connection between this armature and the lever 220 permits of a further shift of the latter, when the secondary magnet 216 is energized whereby the jaws 140 will be further operated to shift the type from the slot 130 of the rod 125 into the galley.

Fixed to and projecting from one end of the armature 224 is an arm 240 that extends over an insulated spring contact plate 241 that is mounted at the top of a post 242 that rises from the plate 210, (see Figs. 4 and 5). The contact plate 241 bears normally against the lower end of an insulated contact screw 244 that passes through the bent upper end of the binding post 242. To one end of the armature 226 is fixed the contact arm 246 of a locking switch, this arm 246 having a depending contact point 247 arranged at a slight distance above and adapted to be forced against the upper end of an insulated contact post 248, that rises from the base plate 210. The upper end of this post 248 may consist of an adjusting screw 249, as clearly shown in Fig. 4 of the drawings. From the plate 210 rises an insulated post 250 to the upper end of which is fixed a flexible contact arm 251 that carries at its free end a double inclined or cam faced block 252, adapted to be engaged by a stud or projection 253 that is formed on the collar 148 fixed to the lower portion of the alining rod 125.

The electrical connections between the parts last described and the operation of such parts will be best understood by reference more particularly to the diagrammatic view Fig. 6 of the drawings. The base plate 210 will be provided with binding posts 270 and 271, which are insulated from the base plate 210 and are connected by wires to a battery or other source of electrical current. A wire 272 connects the binding post 270 with an insulated contact 273 that is fixed beneath and insulated from the plate 160, (see Fig. 3) and this contact is arranged to be engaged by the forward end of the switch lever 132 that is pivotally connected on the underside of the base plate 210. In the diagrammatic view Fig. 6, I have shown a wire *a* connecting the switch lever 132 to the base plate 210, but it will be understood that the connection between this lever 132 and the base plate 210 is through the frame of the machine, and similarly in the diagrammatic views there are shown wires *b*, *c* and *d*, although the parts to which these wires are shown as connected are in fact in direct connection through the machine frame with the base plate 210. The contact arm 251 (see Figs. 4 and 5), is insulated from the base plate 210 and is connected by a wire 275 with one terminal of the secondary magnet 216. The other terminal of this magnet 216 is connected by a branch wire 276 and a trunk wire 277 to the binding post 271. One of the terminals of the primary magnet 215 is connected to the base plate 210, and the other terminal of this magnet 215 is connected by a branch wire 278 and trunk wire 277 to the binding post 271. The contact arm 246 on the armature of the primary magnet 215 is indicated in Fig. 6 as connected by wire *d* to the base plate 210, although in fact, in the machine the connection of the contact arm 246 to the base plate will occur through the core of one of the coils, which is in metallic contact with the base plate 210, and the contact screw 249 with which the contact engages is connected by a wire 279 to the spring contact arm 241. The contact screw 244, which engages contact

arm 241, is connected by a wire 282 to the binding post 270.

By reference to the diagrammatic view Fig. 6 and to Fig. 5 of the drawings, it will be seen that the cam 252 at the end of the contact arm 251 is normally in contact with the extension 253 at the bottom of the alining rod 125, and this contact will be maintained when the type carriers 45 at and about the center of the machine are actuated by corresponding key levers. Assuming one of such centrally disposed type carriers 45 to have been swung downwardly and forwardly by movement of its corresponding key lever, it will be seen that, as the type carrier completes its forward and downward movement, its free end will strike the inner circular end 133 of the switch lever 132, thereby raising the outer end of this switch lever and causing it to close the circuit at the contact 273. At such time the type sustained by the type carrier that has been actuated will stand in line with the slot 130 at the top of the alining rod 125. The circuit being thus closed at the contact 273, current will pass from the battery through binding post 270, wire 272 to contact 273 and thence through switch lever 132 to base plate 210, and from the base plate 210 current will pass through primary magnet 215, and by branch wire 278 and trunk wire 277 to binding post 271, and thence back to battery. As the primary magnet 215 is thus energized, its armature 226 will be attracted and will draw downward the armature lever 220, causing the rear end of this lever 220 to strike the forwardly projecting arm 141[a] of the elbow lever 141. The elbow lever 141 being thus rocked about its pivot point will cause the cams 150 at the upper ends of the spring arms 140 to push the type out of the spring jaws 47 of the type carrier and into the slot 130 of the alining rod 125. Inasmuch as contacts 252 and 253 remain in engagement when a central key lever is operated, the circuit will also be closed through the secondary magnet when the type carrier shifts the contact arm 132 into engagement with the contact 273. This circuit may be traced from battery by wire 272 to contact 273 and arm 132, to base plate 210, by alining rod 125 and its lug or extension 253 to contact arm 251, by wire 275 to secondary magnet 216, and thence by wires 276 and trunk wires 277 to binding post 271 and back to battery. The secondary magnet being thus energized at substantially the same time as the primary magnet, will cause the armature 224 to produce a continued downward movement of the armature lever 220 beyond the movement of such armature lever effected by the armature 226 of magnet 215 with the result that the cams 150 at the upper ends of the spring jaws 140, not only serve to push the type from the type carrier into the slot 130 of the alining rod, but also from said slot into the galley 158.

When a type carrier 45 at one side of the machine is actuated, it is necessary to first insure the deposit of the type in the slot 130 at the top of the alining rod 125, and delay the pushing of the type from the slot 130 into the galley until the slot 130 is directly opposite the galley, and under such circumstances, the secondary magnet 216, which effects the discharge of the type from the slot 130 of the alining rod, will not be energized until the alining rod is restored to the normal position shown in Figs. 3 and 5 of the drawings. The delay in the operation of the secondary magnet 216, until after the alining rod 125 is restored to normal position, will be readily understood when it is remembered that whenever a type carrier 45 at one side of the machine is actuated, the alining rod 125 is partially rotated and the lug or extension 253 is turned out of contact with the cam 252 on the contact arm 251, and the circuit at such point is broken. Hence, it will be seen that when a type carrier at one side of the machine is actuated, the striking of said type carrier against the rear end of the switch lever 132 will close the circuit between such switch lever and the contact plate 273, and current will then pass through the primary magnet 215 in manner hereinbefore described, and cause the type to be pushed from the type carrier into the slot 130 of the alining rod 125, but the circuit being broken through the contact arm 251, the secondary magnet 216 will not be energized until the alining rod has been restored to normal position and circuit is again closed through the contact arm 251, as indicated in the diagram Fig. 6. The shift of armature 226 of the primary magnet will bring the normally open switch contacts 246 and 249 into engagement and close the battery circuit through the magnet 215 independently of the switch contacts 132 and 273 that are closed by the type carrier. This circuit may be traced from binding post 270 by wire 282 to the normally closed contacts 244 and 241, by wire 279 to the contacts 249 and 246 and thence to the base plate 210 and magnet 215 and by wires 278 and 277 back to battery. The circuit through the primary magnet is thus held in closed condition independently of the actuated type carrier and the actuated key may be released to permit the return of the type carrier and alining rod 125 to normal position. As soon as the alining rod 125 returns to normal position the contact 253 thereon reëngages the contact 252 on the arm 251 and current will pass from binding post 270 by wire 282, contact 244, arm 241, wire 279 and contacts 249 and 246 to the base plate 210 and thence by alining rod 125, contacts 252 and 253, arm 251 and wire 275 to the secondary magnet

216 and by wires 276 and 277 and binding post 271 back to battery. The complete depression of the pivoted lever 141 is thus effected and causes the cams 150 at the upper ends of the spring jaws 140 to force the type from the slot 130 of the alining rod into the galley 158. The depression of the contact arm 240 on the armature 224 of the secondary magnet will force the contact arm 241 from engagement with the contact screw 244 and thus break the passage of current through both magnets so that the parts operated thereby will be restored to normal position ready for the next operation. The contacts 246 and 249 are closed by the primary magnet 215 and the contacts 241 and 244 are opened by the magnet 216, when a central key lever is operated, but then magnets act simultaneously, as described, and the circuits therethrough are broken and the parts operated thereby are restored to normal, as soon as the finger key is released. In this way, the type are shifted from any actuated type carrier into the alining rod when the latter is in the position to which it has been turned by the depression of the corresponding key and, when the rod is returned to its normal central position, after the key is released, the type will be further shifted from the slot of the alining rod into the galley. The setting of the type is in no way dependent on gravity, but is positive and may be rapidly and accurately effected. The space bar 283 of the machine will be arranged to set "quads" in the same way that the other keys set type.

It is obvious that numerous changes may be made from the details set forth without departure from the essentials of the invention.

I claim: —

1. A type-setting machine comprising a series of individual type cases, a series of type-carriers for conveying the type from the type cases, a shiftable alining device for receiving the individual type from the type-carriers, a type holder and means for successively discharging the type from said alining device.

2. A type-setting machine comprising a series of concentrically disposed type cases, a series of concentrically pivoted type-carriers for conveying the type from the type cases, a shiftable alining device for receiving the type from the type-carriers, a type holder and means for successively discharging the individual type from said alining device.

3. A type-setting machine comprising a series of individual type cases, a series of type-carriers for conveying the type from the type cases, a shiftable alining device for receiving the type from the type-carriers, means for imparting different extents of movement to said alining device, a type holder and means for successively discharging the individual type from said alining device.

4. A type-setting machine comprising a series of individual type cases, a series of type carriers for conveying the type from said type cases, a pivoted alining device having an open space at its upper end for receiving the type from the type-carriers, means for imparting variable extents of rotation to said alining device and means for discharging the type from said alining device.

5. A type-setting machine comprising a series of individual type cases, a series of key-actuated type-carriers for conveying the type from the type cases, a rotatable alining rod having a slot at its upper end for receiving the type from the type-carriers and means for discharging the type from said alining device.

6. A type-setting machine comprising a concentric series of vertically disposed invidual type cases, a concentric series of type-carriers pivotally mounted below said type cases and provided at their upper ends with means for engaging the individual type, key-actuated mechanism for moving said type-carriers to bring their type-carrying ends to a common point, an alining device at said common point, means for variably rotating said alining device and means for discharging the type from the type-carriers into said alining device.

7. A type-setting machine comprising a series of vertically disposed individual type cases, means for discharging the type from the bottoms of said type cases, a series of key-actuated type-carriers pivoted below said type cases for conveying the type from the type-cases, a shiftable alining device for receiving the type from the type-carriers, a type holder and means for successively discharging the individual type from said alining device.

8. A type-setting machine comprising a series of individual type cases, a series of type-carriers for conveying the type from the type cases, pushers for ejecting the type from the type cases, key-lever mechanism for operating said type carriers and said pushers, lost-motion connections between said key levers and said pushers whereby said carriers are operated in advance of said pushers, and means for discharging the type from the type carriers.

9. A type-setting machine comprising a series of circularly disposed individual type-cases, a series of circularly disposed key-actuated type-carriers for conveying the type from the type cases, a shiftable alining device for receiving the type from the type-carriers and a discharging shifter for first moving the type from said type-carriers into said alining device and for

thereafter moving the type from said alining device into a type galley or holder.

10. A type-setting machine comprising a series of individual type cases, a series of circularly disposed type-carriers for conveying the type from the type cases, a shiftable alining device for receiving the type from the type-carriers, key-levers for actuating said type-carriers and for imparting different extents of movement to said alining device and a discharging shifter for first moving the type from said type-carriers into said alining device and for thereafter moving the type from said alining device into a type galley or holder.

11. A type-setting machine comprising a series of individual type cases, a series of type-carriers for conveying the type from the type cases, a shiftable alining device for receiving the type from the type-carriers, a series of key-levers for operating said type-carriers, means whereby said key-levers are caused to impart different extents of movement to said alining device, and a discharging shifter for successively moving the type from said type-carriers and said alining device into a type galley or holder.

12. A type-setting machine comprising a series of individual type cases, a series of type-carriers for conveying the type from the type cases, a rotatable alining device for receiving the type from the type-carriers, a series of key-levers for actuating said type-carriers, one or more shifting frames arranged to be operated by said key-levers to shift said alining device to different extents and a discharging shifter for successively moving the type from the type-carriers into the alining device and thereafter from the alining device into a type galley or holder.

13. A type-setting machine comprising a series of individual type-cases, a series of type-carriers for conveying the type from the type cases, said type-carriers having arms for engaging the type, a shiftable alining device, means for discharging the type from the type-carriers into said alining device comprising a pivoted lever having forwardly bent arms at its upper end between which the type-carriers will pass in delivering the type and means for actuating said pivoted lever.

14. A type-setting machine comprising a series of circularly disposed individual type cases, a series of circularly disposed key-actuated type-carriers for conveying the type from the type cases, a shiftable alining device for receiving the type from the type-carriers, means for imparting different extents of movement to said alining device, a discharging shifter for successively moving the type from said type-carriers into said alining device and from said alining device into a type galley or holder and electromagnets for progressively actuating said discharging means.

15. A type-setting machine comprising a series of circularly disposed individual type-cases, a series of circularly disposed key-actuated type-carriers for conveying the type from the type cases, a shiftable alining device, means for discharging the type from said type-carriers into said alining device and from said alining device into a type galley or holder, a plurality of electromagnets for successively actuating said discharging device and means for controlling the passage of current through said electromagnets.

16. A type-setting machine comprising a series of circularly disposed individual type cases, a series of circularly disposed key-actuated type-carriers for conveying the type from the type cases, a shiftable alining device for receiving the type from the type-carriers, means for discharging the type from the type-carriers and the alining device, electromagnets for actuating said discharging means and means connected to said alining device for controlling the passage of current through said electromagnets.

17. A type-setting machine comprising a series of individual type cases, a series of type-carriers for conveying the type from the type cases, means for discharging the type from the type-carriers, key-levers for actuating said type-carriers and means for causing a single key-lever to actuate either one of two type-carriers.

18. A type setting machine comprising a series of individual type cases, a series of type-carriers for conveying the type from the type cases, means for discharging the type from said type-carriers, key-levers for actuating said type-carriers, connections between said key-levers and said type-carriers and a lever for shifting said connections in order to enable the same key-levers to actuate different type-carriers.

19. A type-setting machine comprising a series of individual type cases, a series of type-carriers for conveying the type from the type cases, means for discharging the type from the type-carriers, key-levers for actuating said type-carriers, connections between said type-carriers and said key-levers, a shifting plate engaging said connections to cause the same key-levers to actuate different type-carriers and a lever for operating said shifting plate.

20. A type-setting machine comprising a series of individual type cases, a series of type-carriers for conveying the type from the type cases, a shiftable alining device, means for discharging the type from the type-carriers into said alining device, a galley for receiving the type in rows, a composing stick longitudinally movable within said galley wherein the type are delivered

from said alining device and a plunger for successively moving the rows of type along said galley.

21. In a type-setting machine, the combination of a series of concentrically arranged, individual type cases, a series of concentrically arranged type-carriers for conveying the type from the type cases, a series of finger-keys controlling the operation of said type-carriers, an alining device, means controlled by said finger-keys for variably shifting said alining device, and means controlled by said type-carriers and by said alining device for shifting the type from said type-carriers into said alining device and from said alining device into a type galley or holder.

22. In a type-setting machine, the combination of a series of concentrically arranged type cases, a series of concentrically arranged type-carriers for conveying the type from said type cases, finger-keys controlling the operation of said type-carriers, an alining device controlled by said finger-keys and variably shiftable into line with said type-carriers, a shifter having a two-step movement for first moving the type from said type-carriers into said alining device and then from said alining device into a type galley or holder, means operated by said type-carriers for controlling the first movement of said shifter and means controlled by said alining device for effecting the second movement of said shifter.

23. In a type-setting machine, the combination of a series of concentrically arranged type cases, a series of concentrically arranged type-carriers for moving the type from said cases, a set of finger-keys controlling the operation of said type-carriers, an alining device variably shiftable and controlled by said finger-keys, a discharging shifter having a two-step movement for first shifting the type from said type-carriers into said alining device and for further shifting the type from said alining device into a type galley or holder, a pair of electromagnets for effecting the successive movements of said shifter, a switch in the circuit of the first of said magnets controlled by said type-carriers, and a switch in the second of said magnets controlled by said alining device.

24. In a type-setting machine, the combination of a series of concentrically arranged type cases, a series of concentrically arranged pivoted type-carriers for moving the type from said cases, a set of finger-keys controlling the operation of said type-carriers, a rotatable alining device variably shifted by said keys, discharging means having a two-step movement for shifting the type from said type-carriers into said alining device and from said alining device into a type galley or holder, a pair of electromagnets for effecting the successive movements of said discharging means, means controlled by said type-carriers for closing the circuit of the first of said magnets, and means controlled by the first of said magnets and by said alining device for closing the circuits of the second of said magnets.

25. In a type-setting machine, the combination of a series of concentrically arranged type cases, a series of concentrically arranged type-carriers for conveying the type from said cases, a series of finger-keys controlling the operation of said type-carriers, an alining device yieldingly held in central position, and means controlled by said finger-keys for variably shifting said alining device in opposite directions from its normal, central position.

26. In a type-setting machine, the combination of a set of concentrically arranged type cases, a series of concentrically arranged type-carriers for conveying the type from said cases, a set of finger-keys controlling the operation of said type-carriers, a rotatable alining device normally spring-held in central position, means controlled by said finger-keys for variably shifting said alining device in opposite directions from normal, and means for shifting the type from said carriers into said alining device and from said alining device to a type galley or holder.

27. In a type-setting machine, the combination of a series of concentrically arranged type cases, a series of concentrically arranged pivoted type-carriers for conveying the type from said cases, a set of finger-keys controlling the operation of said type-carriers, an alining device normally spring-held in central position and rotatable in opposite directions therefrom, shifters controlled by said finger-keys for variably rotating said alining device in opposite directions from normal, and means for shifting the type from said type-carriers into said alining device and from said alining device into a type galley or holder.

28. In a type-setting machine, the combination with a series of concentrically arranged type cases, a series of concentrically arranged pivoted type-carriers for conveying the type from said cases, a set of operating key-levers for said type-carriers, a rotatable alining device, a pair of springs and a coöperating stop for yieldingly holding said alining device in central position, a pair of shifters variably operated by said key-levers to move said alining device to different extents and in opposite directions from normal, and means for shifting the type from said type-carriers into said alining device and from said alining device into a type galley or holder.

29. In a type-setting machine, the combi-

nation of a series of concentrically arranged type cases, a series of concentrically arranged, pivoted type-carriers for conveying the type from said cases, a set of key-levers for operating said type-carriers, a rotatable alining device, a pair of spring-held shifters and a coöperating stop for yieldingly holding said alining device in central position, said shifters having lost-motion, pin-and-slot connections with said alining device, means operated by said finger-keys for variably actuating said shifters to rotate said alining device to different extents and in opposite directions from normal position, and means for discharging the type from said type-carriers into said alining device and from said alining device to a suitable galley or holder.

30. In a type-setting machine, the combination with a series of concentrically arranged type cases, of a set of concentrically arranged type-carriers for conveying the type from said cases, a set of finger-keys controlling the operation of said type-carriers, an alining device variably shifted by said keys, means operating in the shifted position of said alining device for moving the type from said type-carriers into said alining device, and means operating in the normal position of said alining device for moving the type therefrom into a type galley or holder.

31. In a type-setting machine, the combination with a series of concentrically arranged type-cases, of a series of concentrically arranged, pivoted type-carriers for conveying the type from said cases, a set of finger-keys controlling the operation of said type-carriers, a rotatable alining device variably shifted from normal position by said finger-keys, means controlled by said type-carriers and operable in the shifted position of said alining device for moving the type into the latter from said type-carriers, and means controlled by said alining device and operable in the normal position thereof for moving the type from said alining device into a type galley or holder.

32. In a type-setting machine, the combination with a series of concentrically arranged type cases, of a set of concentrically arranged, pivoted type-carriers for conveying the type from said cases, a set of finger-keys for operating said type-carriers, a rotatable alining device variably shifted from normal position by said finger-keys, shift mechanism coöperating with said alining device, means controlled by said type-carriers for operating said shift mechanism to move the type from said type-carriers into said alining device when the latter is in its shifted position, and means controlled by said alining device for operating said shift mechanism in the normal position of said alining device to move the type therefrom into a type galley or holder.

33. In a type-setting machine, the combination with a series of concentrically arranged type cases, of a set of concentrically arranged type-carriers for conveying the type from said cases, a set of finger-keys for operating said type-carriers, an alining device variably shiftable from normal position and controlled by said finger-keys, a discharging shifter movable with said alining device, means for operating said shifter to move the type from said type-carriers into said alining device and means for operating said shifter to move the type from said alining device into a type galley or holder.

34. In a type-setting machine, the combination with a series of concentrically arranged type cases, of a set of concentrically arranged, pivoted type-carriers for conveying the type from said cases, a set of finger-keys controlling the operation of said type-carriers, an alining device variably shiftable from normal position and controlled by said finger-keys, a shifting device connected to and moving with said alining device, means for operating said shifting device in any one of its different positions to move the type from said type-carriers into said alining device and means for operating said shifting device in its normal position to move the type from said alining device into a type galley or holder.

35. In a type-setting machine, the combination with a series of concentrically arranged type cases, of a series of concentrically arranged, pivoted type-carriers for conveying the type from said type cases, a set of finger-keys for operating said type-carriers, a rotatable alining device variably shifted from normal position by said finger-keys, a type shifter pivotally mounted on said alining device and moving therewith, means controlled by said type-carriers for operating said shifter in any one of its different positions to move the type from said type-carriers into said alining device, and means controlled by said alining device and operable in the normal position thereof for actuating said shifter to move the type from said alining device into a type galley or holder.

36. In a type-setting machine, the combination with a series of concentrically arranged type cases, of a set of concentrically arranged type carriers for conveying the type from said cases, a set of finger keys for operating said type carriers, an alining device for receiving the type from said type carriers, means controlled by said finger keys for variably shifting said alining device from and back to normal position and means operable in the normal position of said alining device for moving the type therefrom.

37. A type setting machine comprising a series of individual type cases, a series of type carriers for conveying the type from the type cases, a shiftable alining device for receiving the type from the type carriers, a series of finger keys for operating said type carriers, means controlled by said finger keys for variably shifting said alining device from and back to normal position and means acting in the normal position of said alining device for successively discharging the type therefrom into a type galley or holder.

JOHN B. ODELL.

Witnesses:
HARRY L. CLAPP,
KATHARINE GERLACH.