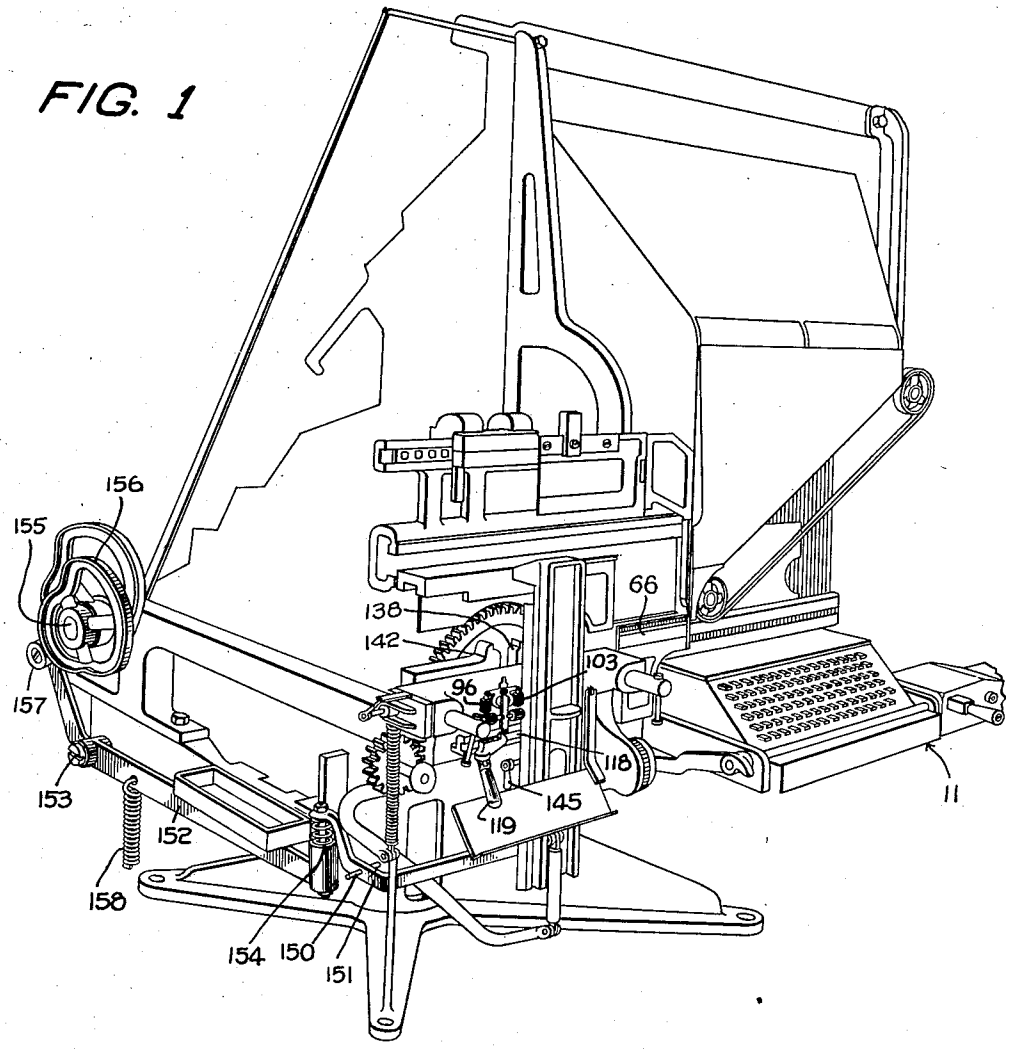
Feb. 28, 1939. M. T. GOETZ 2,148,549

AUTOMATIC CONTROL OF QUADDING AND CENTERING DEVICES

Filed Dec. 31, 1934 3 Sheets-Sheet 1

FIG. 1



INVENTOR
MAURUS T. GOETZ
BY H. B. Whitfield
ATTORNEY

Feb. 28, 1939. M. T. GOETZ 2,148,549

AUTOMATIC CONTROL OF QUADDING AND CENTERING DEVICES

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FIG. 5

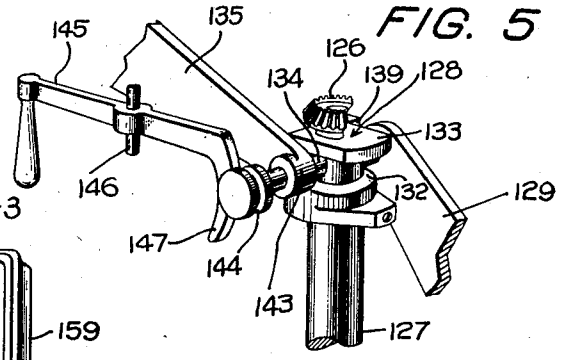


FIG 2

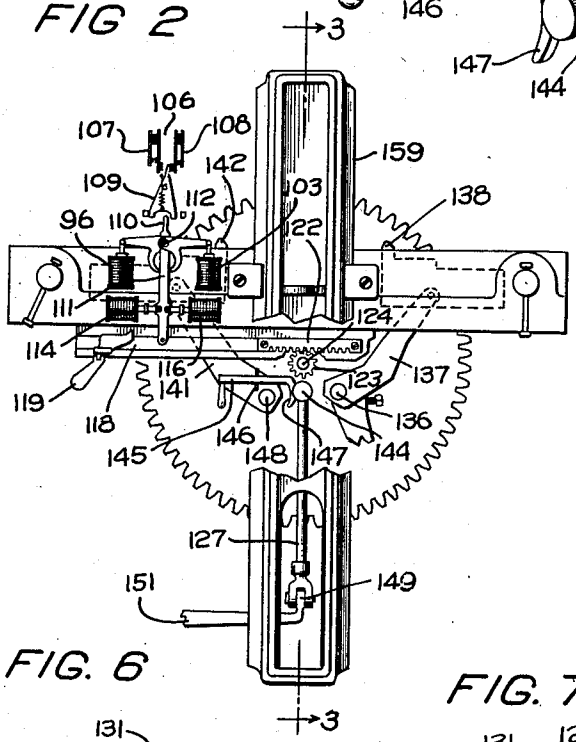


FIG. 3

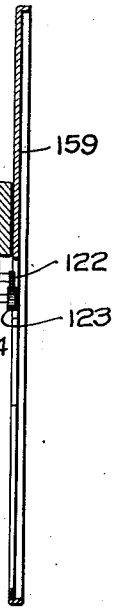


FIG. 6

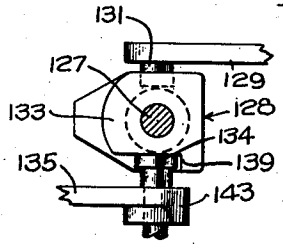
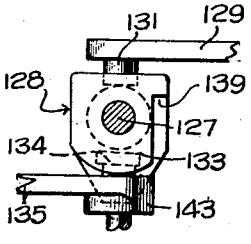


FIG. 7



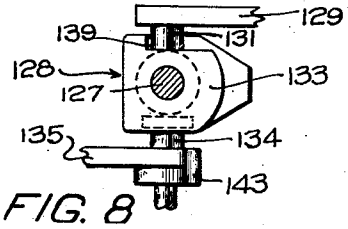


FIG. 8

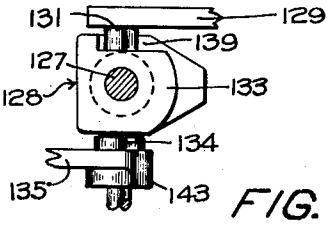


FIG. 9

INVENTOR
MAURUS T. GOETZ
BY H. B. Whitfield
ATTORNEY

Feb. 28, 1939. M. T. GOETZ 2,148,549

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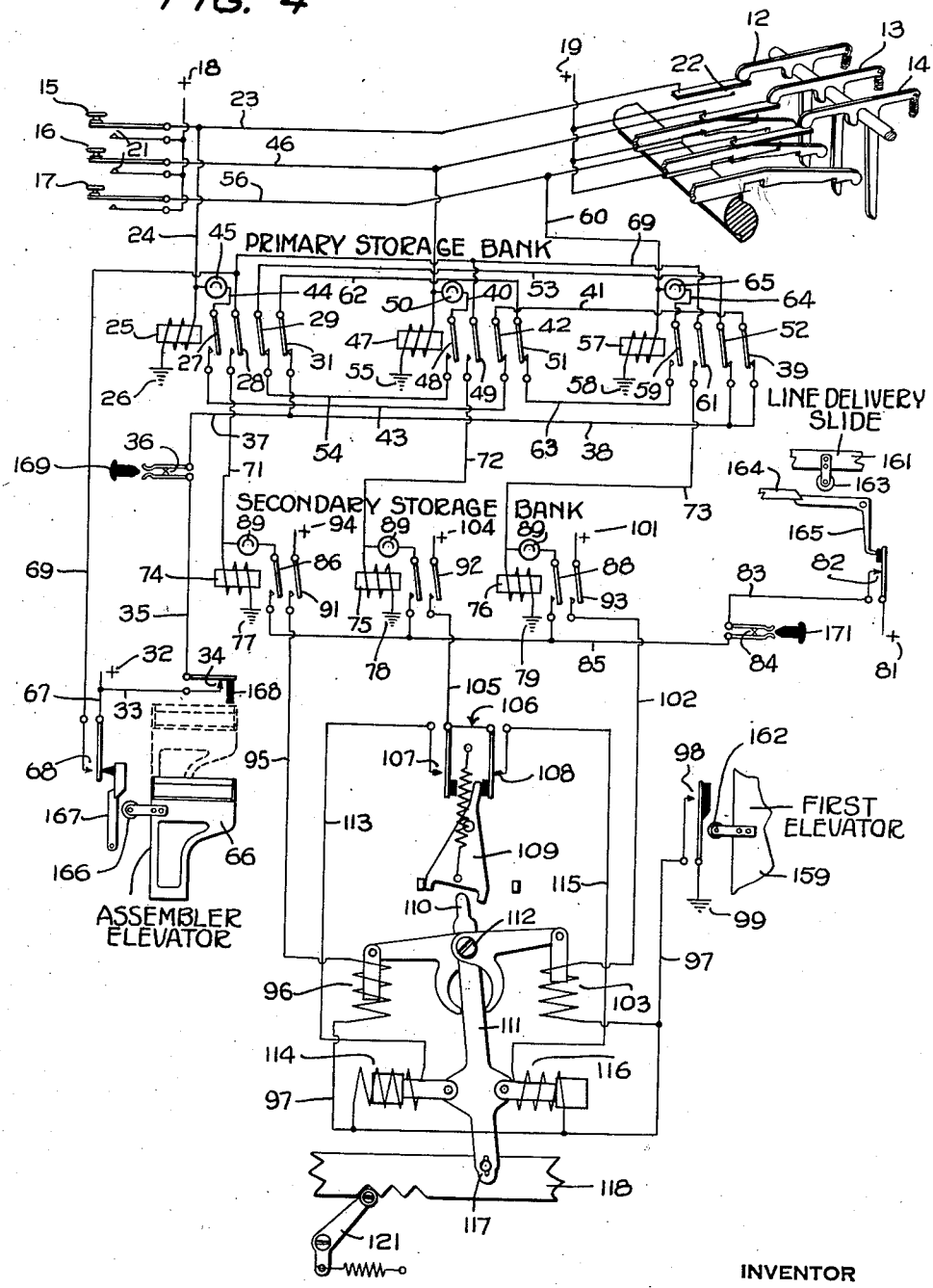
FIG. 4



INVENTOR
MAURUS T. GOETZ
BY H. B. Whitfield
ATTORNEY

Patented Feb. 28, 1939

2,148,549

UNITED STATES PATENT OFFICE

2,148,549

AUTOMATIC CONTROL OF QUADDING AND CENTERING DEVICES

Maurus T. Goetz, Chicago, Ill., assignor, by mesne assignments, to Teletypesetter Corporation, a corporation of Delaware

Application December 31, 1934, Serial No. 759,832

20 Claims. (Cl. 199—50)

The present invention relates to linecasting and composing machines and more particularly to such machines when operated automatically and equipped with apparatus for quadding and centering assembled lines of matrices during the casting operation.

An object of the present invention is the provision of a control unit arranged with elements responsive to predetermined control signals for selectively operating quadding and centering attachments of the linecasting machine to present the assembled lines of matrices in accordance with their operation to the casting chamber.

During automatic line composition, it is frequently desirable to obtain staggered line justification, sometimes referred to as quadded lines, in which assembled matrices with or without space bands are moved either to the right or to the left in order to obtain a stepped effect, as in the case of newspaper headline composition. In three-line columns, the central line is preferably centered, the first line moved to the left, and the third line to the right. In certain other cases, as in concluding partial lines of paragraphs, it is desired to quad the line fragments to the left. In obtaining the above and other quadding operations in connection with automatic line composition, it is proposed, in accordance with the provisions of the present invention, to obtain the quadding operation during the presentation of the assembled lines at the casting chamber and to shift the assembled lines of matrices thereat so as to present the casting intaglio into a position corresponding to the quad selection control.

Accordingly, the present invention contemplates the provision of a pair of floating vise jaws presented on opposite sides of an assembled line of matrices that has been delivered to the casting chamber in front of the mold disc. An operating train deriving power from the principal cam shaft of commercially well-known types of linecasting and composing machines is selectively associated with each of the floating vise jaws. The application of power is controlled by a shiftable rack in accordance with the predetermined positioning of which a universal connector is correspondingly arranged communicating the operating power with either or both of said vise jaws. During a predetermined instant preparatory to the casting operation, either or both of said jaws are moved, shifting the assembled line of matrices rightwardly, leftwardly, or in central position. In order that the terms "quad-right" or "quadding to the right" and "quad-left" or "quadding to the left" may be clearly understood as used in the following description, it may be stated that quadding to the right may also be described as spacing to the right, which action involves the provision of spaces at the right-hand end of a slug and is accomplished by movement of the right-hand vise jaw to position the type character matrices and the space bands to enable the casting of a blank slug portion at the right. Conversely, "quad-left" or "quadding to the left" may be described as spacing to the left. It is accomplished by movement of the left vise jaw, and results in a blank space at the left of the slug. In a quadding operation, a vise jaw moves opposite to the direction, the name of which it bears. Thus in quadding left, a quad-left vise jaw moves to the right and in so doing moves assembled matrices and space bands to the right, and in quadding right, the quad-right vise jaw, matrices and space bands move to the left. If the assembled matrices and space bands upon delivery to the casting position should accidentally assume the proper position for a predetermined quadding operation, they may suffer no movement under the influence of a vise jaw, but the quadding operation will involve movement of a vise jaw in the direction outlined above.

In accordance with a preferred embodiment of this invention, the control is governed by the alternative energized condition of a set of operating solenoids energized in accordance with quadding signals. The signals are preferably effective through the instrumentality of a record reader mechanism and selectable control elements as particularly disclosed and described in Patent No. 2,091,286 granted August 31, 1937, to Howard L. Krum et al. Where linecasting machines are adapted for both automatic and manual keylever control, means are also provided for manual operation of the appliance embodied in the present invention. The three classes of quadding signals as above described, after being initiated either through automatic or manual control, are thereafter stored in a set of primary storage relays, following which, under the control of the elevator mechanism associated with the casting apparatus, they are transferred to the corresponding relay located in a secondary storage bank while the primary bank is restored to normal condition for reception of a succeeding quadding signal.

The transfer of a quadding signal from the primary bank to the secondary bank coincides with the advancement of an assembled line of matrices from its composing level to its delivery slide level where, as is well known in commercial line composition machine structure, an assembled

line of matrices may momentarily be suspended to await the readiness of the casting apparatus. Upon the transfer of an assembled line of matrices from the delivery slide level to the casting chamber, the quadding signal stored in the secondary storage relay bank is communicated to an operating solenoid, which signal is then effective for the ultimate purpose of correspondingly adjusting the universal connector described above and for effecting the proper response on the part of either or both quadding vise jaws. Accordingly, the quadding or centering control is incorporated into the linecasting machine operation under automatic supervision of a record reader control unit which performs the line composing functions as well as the collateral control functions incident to line composition.

For a more comprehensive understanding of the present invention, reference may be had to the accompanying drawings and to the following detailed description wherein similar reference characters indicate corresponding parts throughout, and wherein:

Fig. 1 is a general perspective view of a commercial type of linecasting machine having applied thereto quadding and centering control apparatus within the contemplation of the present invention;

Fig. 2 is a detailed front elevation of the so-called first elevator of a line composing machine, a portion of the casting mechanism, and certain elements for carrying out the features of the present invention;

Fig. 3 is a vertical sectional view taken approximately on line 3—3 of Fig. 2;

Fig. 4 is a wiring diagram of a control circuit which may be employed in connection with the embodiment of the present invention featured in Figs. 1 to 3;

Fig. 5 is a fragmentary perspective view of the universal connector by means of which the quadding device power mechanism is selectively applied to either or both of the quadding vise jaws, and

Figs. 6 to 9 are detailed plan views of the universal connector featured in Fig. 5, illustrating the various conditions of operation that may be obtained by rotating the connector.

In Fig. 1, the reference character 11 refers generally to an automatic control unit that is provided with a record reader mechanism which comprises a plurality of selectable elements some of which are allotted to the execution of the functions of matrix release, others to the execution of various collateral functions such as rail shift, elevator operation, etc., but three or four of which are particularly concerned in connection with the supervision and control of the apparatus embodying the present invention.

In Fig. 4, three automatically selectable elements relating to the present invention are indicated 12, 13, and 14. The element 12 is assigned to the control of the left quadding. In response to its selection, the left-hand vise jaw in the casting mechanism is made to move the assembled line of matrices to the right side casting position. In inverse manner, the selection of element 14 moves the right-hand vise jaw so as to shift the assembled line of matrices to the left. Upon the selection of the intermediate selectable element 13, however, both vise jaws in the casting apparatus are actuated simultaneously, effecting a centering of the assembled matrices and distributing the available space equally in a manner that may be understood more comprehensively by a reading of the following detailed description.

A set of three manual control keys 15, 16, and 17 parallel the three automatic levers 12, 13, and 14 in arrangement and operation, each affording a means for manually initiating a response in the quadding vises similar to the response produced by their corresponding levers 12, 13, and 14. A selecting signal originating by the actuation of either manual key 15 or automatic lever 12 closes a circuit beginning with positive potential source 18 or 19, passing through the contact pair 21 or 22, then continuing over common line 23 to the line 24, winding of quad-left primary storage relay 25, to ground at 26. The energization of relay 25 attracts its four armature contactors 27–29 and 31. Contactor 27, upon closure with its contact point, completes a locking circuit originating with positive current source 32 and continuing over line 33, contact pair 34, line 35, contact pair 36, lines 37 and 38, the contact and armature 39, line 41, armature 42 and its associated contact line 43 to the contact and armature 27, thence over line 44, through the filament of signal lamp 45, winding of relay 25, to ground at 26.

In a similar manner the actuation of manual key 16 or automatic lever 13 sends an energizing impulse over line 46 to the centering relay 47 of the primary storage relay bank. This relay is similarly provided with four armature contactors indicated 48, 49, 42, and 51. The locking armature 48 of relay 47 lies in the circuit originating with positive current source 32, line 33, contact pair 34, line 35, contact pair 36, lines 37 and 38, contact and armature 52, line 53, armature 29 and its associated contact, line 54, armature 48 and its associated contact, line 46, the filament of index lamp 50, winding of relay 47 to ground 55.

Likewise the actuation of manual key 17 or automatic lever 14 transmits a control pulse over common circuit 56, line 60, through the winding of quad-right relay 57 to ground at 58. This relay controls a set of four armature contactors 59, 61, 52, and 39. Its locking armature 59 is in a circuit originating with positive source 32 and continuing over line 33, contact pair 34, line 35, contact pair 36, line 37, armature 31 and its associated contact, line 62, armature 51 and its associated contact, line 63, armature 59 and its associated contact, line 64, filament of lamp 65, through the winding of relay 57 to ground at 58.

Thus the locking armature of each relay 25, 47, and 57 is in the circuit which includes also a contact located under the control of each of the other relays 25, 47, or 57. In this way the storing of a signal in the primary storage bank in one of the relays 25, 47, or 57 prevents the concurrent operation of any of the other of these relays until such time subsequent to the storage operation when the particular signal is transferred from the primary storage bank to the secondary storage bank.

To understand the utility of this transfer, it should be borne in mind that coincident with the transmission of a quadding signal there is set up in accordance with the composing mechanism control an assembled line of matrices in the assembly elevator 66 which the particular quad signal is to modify. The assembled line of matrices must not at once proceed to the casting chamber but may instead await its sequence. This delay is caused by a characteristic operation of commercial types of linecasting machines whereby the composing mechanism is adapted to entertain a particular line of composition at the

composing level during the same instant in which a preceding line is suspended in the line delivery slide level awaiting transfer to the casting chamber and in which a third line is being entertained in the casting chamber proper and is actively performing the slug casting operation. Since three lines of composition may at the same instant be in various stages of progress, it is necessary that means be provided for storing their three associated quadding control signals.

Accordingly, the most recently composed line finds its associated signal in the primary storage relay bank aforedescribed, the intermediate waiting line of composition in the secondary storage relay bank, while the active line finds its signal already communicated to the operating solenoids. In the case of relays **25**, **47**, and **57** and associated control contacts **28**, **49**, and **61**, each when brought into engagement with its contact point prepares a path originating at positive current source **32**, line **67**, contact pair **68** and line **69**, which in turn communicates with the three armatures **28**, **49**, and **61** parallelly. Separate circuits **71**, **72**, and **73** extend from the contact points controlled by armatures **28**, **49**, and **61**, respectively, to individual secondary storage relays such as **74**, **75**, and **76**. Line **71** continues through the winding of relay **74** to an individual ground **77**, line **72** through the winding of relay **75** to a ground **78**, and line **73** through the winding of relay **76** to a ground **79**. Each of the secondary relays **74** to **76** is provided with a locking circuit for maintaining it closed after the signal transfer operation has been consummated. These locking circuits are traceable from positive current potential **81**, contact pair **82**, line **83**, contact pair **84** to common line **85**, from which separate circuit branches are obtained leading to the contact points of the armatures **86**, **87**, and **88**. The individual circuits leading from the armatures then continue through associated filaments of index lamps **89**, through the windings of their respective relays, to their associated grounds **77–79**.

The operating contacts of the secondary storage relays are controlled through the medium of their armatures **91**, **92**, and **93**, respectively. The left-quad relay **74** prepares an operating circuit from positive current source **94**, through armature **91** and its associated contact, line **95** to the winding of an operating solenoid **96**, thence through a common return wire **97**, contact pair **98**, to the ground **99**. The right-quad relay **76** in like manner prepares a circuit originating at positive current source **101**, through the armature **93** and its associated contact point, the line **102**, through the winding of an operating solenoid **103** to the common return wire **97**, while the centering relay **75** prepares a circuit from positive current source **104**, through its armature **92** and its associated contact, line **105** to a shuttle switch **106** which communicates with either one or the other of a pair of contact points **107** and **108**, depending upon the preceding condition of the switch control lever **109**, which in turn is dependent upon the preceding operation of either of the solenoids **96** or **103**.

If the preceding quad signal was a left-quad control signal, solenoid **96** was the last to have been operated, leaving the main control lever **111** in its counterclockwise extremity as illustrated in Fig. 4, lever **111** being pivotable about point **112** as a center. With the main lever **111** in its counterclockwise position, a projection **110** carried thereby engages one side of the forked end of lever **109** and causes the latter member to be rotated to its extreme clockwise position. Under this condition the path from circuit **105** is traceable through the shuttle switch **106** and contact point **108**, thence over line **115**, through the winding of the centering solenoid **116**, thence to the common return line **97**. Solenoid **116**, upon energization, then functions to rotate lever **111** from its counterclockwise extremity to a central position.

If, on the other hand, the right-quad solenoid **103** was the last to have been operated, lever **111** would remain in its clockwise extreme position, shifting lever **109** in a reverse direction so that shuttle switch **106** contacts with point **107**. Under this condition the circuit **105** is traceable from this point over line **113** to the opposite centering solenoid **114** which thereafter functions to move main operating lever **111** from its extreme clockwise position to its centering position. As set forth in the preceding paragraphs, control lever **109** may be presented in either of two controlling conditions with respect to shuttle switch **106**, motion to either of these two controlling conditions being imparted by projection **110** of main control lever **111**. Retention of lever **109** in its extreme clockwise and counterclockwise positions is accomplished by the spring shown in Fig. 4. The noted spring is distended between spring posts and is effective as the lever **109** is rocked from one or the other of its control positions. Movement of lever **109** is thus completed following its initial motion by lever **111**.

In accordance with the present embodiment, the centering solenoids **114** and **116** are illustrated as being independent elements for moving lever **111** from either of its extreme positions to its central position. The above result may also be obtained by providing circuit connections between the solenoids **96** and **103** for energizing them concurrently and for thereby centering the main operating lever **111**. The manner in which lever **111** is controlled is therefore viewed as merely subservient to the particular linecasting machine structure and to the convenience of individual operators. The essentials of the present invention are predicated therefore upon the provision of means for controlling a three-condition quadding mechanism by means of three selectable elements of an automatic control unit, the specific arrangement being largely dependent upon the particular type of quadding mechanism to which the control is to be applied.

The movement of the main operating lever **111** is transmitted through the loose link connection **117** to a control rack bar **118**, see also Figs. 1 and 2. The rack bar **118** may ordinarily have associated with it a manual control lever such as **119**, and is capable of three positions represented by the three detent notches into which the jockey bell crank **121** presents itself alternatively. The opposite end of rack bar **118** carries a rack toothed segment **122**, which cooperates with a rack pinion **123** best illustrated in Fig. 3. The pinion **123** is carried by a stub shaft **124** on the opposite end of which there is secured a beveled gear **125** that meshes with a corresponding beveled gear **126** carried by the vertical operating shaft **127**. The ratio between gears **125** and **126** is such that in accordance with the three horizontal positions of rack bar **118**, the motion transmitted to shaft **127** causes it to rotate through 180°, its intermediate position being 90° from either one of its extreme positions.

Noting now the illustrations of Figs. 6 to 9,

it will be observed that the shaft 127 and the connector 128 carried by it are capable of three conditions of operation, one of which is further modified giving a total available selection of four conditions. Fig. 6 illustrates its condition during right-quadding position. At this time the right-hand lever 129, through its stud 131, being operatively engaged with the connector 128, is then presented within the groove 132, see also Fig. 5. When in this position, the upper flange 133 of connector 128 is presented so that its portion of greater radius overlies the stud 131 while its diametrically opposite portion which is cut away as at 139 clears the stud 134 of left-hand vise lever 135. If, under this condition, the vertical operating shaft 127 is thrust downwardly cyclically, motion is imparted to right-hand lever 129 but not to left-hand lever 135. This rotates lever 129 about its center 136 counterclockwise, causing its associated lever arm 137 to move the right-hand vise jaw 138 leftwardly, thereby effecting what is known as a right-quad operation, the assembled matrices being presented on the left extremity of their available line space.

When the universal connector is rotated into a position such as that illustrated in Fig. 7, which is known as the centering position, both studs 131 and 134 are engageable by the flange 133. Under this condition of operation the cut away section 139 is presented at the right end and is ineffective. If the vertical operating shaft 127 now is moved downwardly, both lever arms 129 and 135 are effective for moving their vise jaws 138 and 142 through the medium of lever arms 137 and 141, so that the assembled line of matrices is centrally disposed with equal space indentations on both ends of the line.

The position indicated in Fig. 8 is known as the left-hand quadding position. In this case the universal connector 128 is 180° from its position as illustrated in Fig. 6. Here the cut-away portion 139 is in registration with the stud 131 of right-hand lever 129, while the opposite stud 134 of the left-hand lever 135 underlies the flange 133. Hence, when the vertical operating shaft 127 receives its cyclic movement, the left-hand operating lever 141 alone is actuated, moving the assembled line of matrices rightwardly into the left-hand quadding position.

Since it is not always essential or desirable that the quadding vises be effective, means are provided whereby both vises may be disassociated conveniently and without altering materially the condition of the several operating parts. The inoperative position is shown in Fig. 9. Here the universal connector 128 is presented in the same position as in the case of Fig. 8. The right-hand operating lever 129 is then disassociated by virtue of the cut away portion 139, but in order to render the left-hand vise lever 135 inoperative, its engagement lug 134 is withdrawn. It will be noted that lug 134 is longitudinally shiftable in its supporting boss 143 and is provided at its opposite extremity with a grooved flange 144. A lever 145, pivotally supported at 146 in a stationary portion of the casting mechanism has integrally formed with it an arcuate segment 147 that is adapted to be received within the groove of flange 144. The arc of segment 147 has a radius coincident with the pivotal center 148 about which the left-hand vise lever 135 is rotated. Thus, during the reciprocation of lever 135, the groove of flange 144 is at all times operatively connected with segment 147, which, as explained above, is supported from a stationary portion of the machine.

The operating rod 127 which, as described before, receives a periodic vertical motion, is connected through the coupling 149 with a lever 151 pivoted at 150, Figs. 1 and 2. A main operating lever 152 pivoted at 153 is cyclically actuated by the apex of a cam 156 working in opposition to a return spring 158. The cam 156 is carried by the main cam shaft 155 of the principal machine and its apex encounters the follower roller 157 of lever 152, causing its opposite arm, acting through a compression spring 154, to impart clockwise motion to the lever 151, thrusting downwardly the end coupled at 149 to the rod 127. The contour and timing arrangement of cam 156 is preferably such that lever 152 is reciprocated counterclockwise, lever 151 clockwise, and rod 127 moved downwardly at a time shortly after a line of matrices has been presented in casting position, the reverse operation following shortly after a slug has been cast. The compression spring 154 serves to absorb the motion and avoid rupture in the event that the free movement of shaft 127 or lever 151 is restrained.

In order to better understand the sequence of operation of the several signal storage elements as related to the line composing apparatus and the condition of several assembled lines of matrices which may be found in various stages of progress as explained above, a brief résumé of the operation will now be had.

Operation

It will be supposed that the line composing and casting machine is operated at the peak of its efficiency, under which condition a particular line of matrices is being assembled in the assembler elevator 66; a preceding line of matrices is awaiting delivery and is presented at the level of the line delivery slide 161, while a third line of matrices is being entertained within the casting mechanism. Accordingly, three quadding signals are stored; the first in the primary storage relay bank, the second in the secondary storage relay bank, and the third having been just received in one or another of the operating solenoids 96, 103, 114, or 116. To diversify the illustration, it will be supposed that the three lines constitute a stepped headline wherein the first line, which is in the casting mechanism, is a right-quad operation, the second a center-quad operation, and the third a left-quad operation. Under this condition, the particular solenoid that is effective during the instant in which the first line is being cast is the solenoid 103 which moves the main operating lever 111 into its clockwise extremity and presents the rack bar 118 in its right-quad position. The signal to be associated with the intermediate line of matrices that is awaiting on the delivery slide level is stored in the relay 75 of the secondary storage bank, it having reached that position during the elevation of its associated line of matrices by the assembler elevator 66 and transfer of the line to the line delivery slide 161 as a direct result of previous energization of primary storage relay 47 in response to selection of member 13 or operation of key 16. Thus relay 75 is energized during the occupation of the casting position by the preceding line. The signal that is to be associated with the final line or the one that is just completing composition is stored in the relay 25 of the primary storage relay bank.

Following this condition, the first elevator 159

begins its ascent for delivering the matrices which have completed their cooperation with the casting mechanism to the distributor elevator when the roller 162, Fig. 4, comes into engagement with the contactor of contact pair 98, closing the latter and completing the circuit, which occurs when the first elevator reaches its intermediate level. A circuit is completed originating in the particular case at the positive current source 104 and continuing through the armature 92 and its associated contact point (because relay 75 is energized), line 105, shuttle switch 106, contact point 107 (because the main switch 111 was last in its clockwise extremity), causing lever 109 to be presented in its counterclockwise extremity, thence over line 113, through the winding of solenoid 114, common return line 97, contact pair 98, to ground at 99. This causes the energization of solenoid 114 which moves main operating lever 111 from its extreme clockwise position to its central position, moving rack bar 118 accordingly from its left-hand position to its intermediate position. The movement of rack bar 118 causes the universal connector 128 to shift from a position such as that illustrated in Fig. 6 to that illustrated in Fig. 7.

Meanwhile, the first elevator 159 has delivered its line of matrices to the distributor elevator and the line delivery slide 161 has been released to move the intermediate line of assembled matrices into position with the first elevator. When this occurs, a roller 163 carried by the slide 161 comes into engagement with a projection 164 which acts upon the bell crank 165 for opening the contactor of contact pair 82 to break the common locking circuit which had been holding relay 75 energized at point 82, permitting its armatures to be released. Upon its return, the delivery slide rides off the projection 164, permitting again the closure of the locking circuit. Upon the return movement of the line delivery slide, its delivery slide arm which is interlocked in control with the assembling elevator in a manner more fully described in Patent No. 2,091,286 granted August 31, 1937 to Howard L. Krum et al. permits the release of the assembling elevator 66 with its assembled line of matrices. As soon as the elevator 66 starts its ascent, a roller 166 carried thereby cams lever 167, causing the closure of contact pair 68. This completes a circuit which had been prepared by the energization of relay 25, traceable from positive current source at 32, over line 67, through the contact pair 68, line 69, armature 28 and its associated contact (which is closed at this instant because of the energization of relay 25), line 71, winding of relay 74 to the ground 77. The prepared circuit is maintained in condition for completion by reason of the continued energization of relay 25 from a locking circuit traceable from positive current source at 32 through contacts 34, over conductors 35, 37, and 32, contact and armature 39 of relay 37, conductor 41, contact and armature 42 of relay 47, conductor 43, contact and armature 27 of relay 25, lamp 45, and winding of relay 25 to ground 26. Thus the signal stored in relay 25 is effectually transferred to its associated secondary storage relay 74. The relay 74, once energized, is maintained locked over the common locking circuit 85, 83, etc., described above.

When the elevator 66 attains the line delivery slide level, it encounters an insulated block 168 associated with the contactor of contact pair 34, opening the common locking circuit which had been holding relay 25 energized. Upon the return of elevator 66, the locking circuit is reestablished in readiness for a succeeding quadding signal to be delivered by the manual keylevers 15, 16, and 17 or automatic control levers 12, 13, or 14. As soon as the elevator 66 returns to its matrix assembling level, line composition is resumed in accordance with the record reader control described in the copending application referred to above, and as this line is completed, another quadding signal may be received by one of the levers 12, 13, or 14, which, upon its closure of its associated contact pair 22, introduces an impulse that is stored in the primary storage relay bank.

Thus it will be understood that the present invention contemplates a series of signal storage systems operative progressively to associate certain modifying signals with their related lines of matrices which in turn are also stored in the course of various steps between their line composing position and their casting position.

For purposes of rendering the storage system more readily controllable and adjustable, manual unlock keys are provided for breaking the locking circuits and permitting the reinsertion of alternative quadding signals in the place of particular signals which it may be desired to change. For example, in the primary storage relay bank, one such key indicated 169 is provided in the circuit originating with positive current potential 32, line 35, and contact pair 36. Key 169 opens the contact pair 36 upon its operation and, upon its release, permits the reengagement of the contact pair, whereupon an alternative signal may be installed upon one of the relays 25, 47, or 57, manually.

In a manner similar to that aforedescribed, the quadding signal stored in the secondary storage relay bank may be deleted by the actuation of release key 171, which acts upon the contact pair 84 of the common locking circuit originating at positive current potential 81. To change the quadding signal associated with the particular line of composition already entertained in the casting chamber, it is but necessary, of course, to shift the manual control handle 119 from any particular position to any other.

While the present invention has been explained and described in contemplation of a specific embodiment, it will be readily understood that numerous modifications and variations may be incorporated without departing from the spirit or scope thereof. It is therefore intended not to be limited by the specific language in the foregoing specification, nor by the details in the accompanying illustrations, except as indicated in the hereunto appended claims.

What is claimed is:

1. In a line composing machine, matrix assembling means, a casting mechanism, means associated with said casting mechanism for supporting a line of assembled matrices in slug casting position, means for supporting a line of assembled matrices intermediate said matrix assembling means and said casting mechanism, storage means for receiving a casting operation modifying signal to affect an assembled line of matrices contained in said assembling means, storage means for receiving a modifying signal to affect a line of matrices contained in said intermediate supporting means, storage means for receiving a modifying signal to affect an assembled line of matrices contained in said casting mechanism, and transfer apparatus for advancing the modifying signals from each of said storage means to

a succeeding storage means progressively as its associated lines of matrices are advanced.

2. In an electrical system, a principal mechanism including three successively operating devices, a primary set of relays for storing a signal relating to subject matter contained in a first one of said devices, a secondary set of relays for storing a signal to modify subject matter contained within a second one of said devices, tertiary means for storing a signal to modify subject matter contained within the third of said devices, and means under the control of each of said devices during its performance for transferring a stored signal from one of said sets of relays to a succeeding set.

3. In a linecasting and composing machine, means for assembling a line of matrices, means for supporting a line of matrices in casting operation, means for supporting a line of matrices intermediate said two aforementioned means, a set of storage relays upon which may be impressed a control signal for governing a casting operation relating to the line of matrices in said assembling mechanism, a set of storage relays to which may be transferred a control signal for governing a casting operation relating to the assembled line of matrices supported in said intermediate means, a set of storage elements for containing a casting operation control signal relative to the assembled line of matrices in said casting mechanism, and means for advancing each signal to its succeeding storage means as its related assembled line of matrices is advanced.

4. In a linecasting and composing machine, three progressively operative organs, means for advancing a line of assembled matrices from one of said organs to the other sequentially, signal storage means associated with each of said organs, and means for transferring a signal from one storage means to another in accordance with the progress of its associated organ.

5. In a linecasting and composing machine, an assembler elevator, a matrix line delivery slide, a first elevator, a first set of signal storage means corresponding to said assembler elevator, a second set of signal storage means corresponding to said delivery slide, a third set of signal storage means corresponding to said first elevator, means under the control of said first elevator for transferring a signal from said second storage means to said third storage means, and means under the control of said delivery slide for transferring a signal from said first storage means to said second storage means.

6. In a linecasting and composing machine, three successively operative organs, three sets of storage relay banks, each set associated with one of said organs, means under the control of said organs for transferring a signal from one of said storage sets to another, and means associated with the primary one of said storage sets for preventing duplicate signal storage comprising locking circuit paths associated with each storage element of said set having circuit breaker means under the control of the other storage elements of said set.

7. In a linecasting and composing machine, three successively operative organs, three sets of storage relay banks, each set associated with one of said organs, means under the control of said organs for transferring a signal from one of said storage sets to another, and means associated with the primary one of said storage sets for preventing duplicate signal storage.

8. In a line composing machine, a line assembling mechanism, a line delivery mechanism, and a slug casting apparatus, a set of storage relays associated with said line assembling mechanism, a set of storage relays associated with said delivery mechanism, a set of elements associated with said casting mechanism, and visual index means for denoting a signal storage condition associated with each of said storage means and said element.

9. The combination set forth in claim 8 including locking circuits for maintaining the storage signal condition of each set of said relays and said elements, and manual control means for opening said locking circuits for deleting a storage condition in order to permit the substitution of another storage condition in its stead.

10. In a linecasting and composing machine, a line delivery slide mechanism for supporting an assembled line of matrices during transit between a composing mechanism and a casting mechanism, a set of storage relays for receiving a casting control signal relative to the matrices contained in said line delivery slide, and means under the control of said line delivery slide during its operation for deleting a signal stored in said relays.

11. In a linecasting and composing machine, an assembling elevator for receiving slug casting matrices during line composition, a set of storage relays for receiving a casting mechanism control signal relating to the matrices in said assembling elevator, and means under the control of said elevator during its transit for deleting said signal and thereby preparing said storage relays for a succeeding signal.

12. In a linecasting and composing machine, a casting mechanism, a pair of matrix vise jaws capable of three conditions of operation, a control element having three linear positions corresponding to said conditions of operation, and electromagnetic operating means for moving said control element from any of its three positions to any other one of said three positions to vary said conditions of operation.

13. In a linecasting and composing machine, a composing mechanism, a casting mechanism, means for supporting a line of matrices during its transit from said composing mechanism to said casting mechanism, means for concurrently storing a casting mechanism control signal associated with said line in said supporting means, and means for transferring said storage signal to control said casting mechanism concurrently as said supported line is advanced.

14. In a linecasting and composing machine, a pair of line clamping jaws movable one relatively to the other for quadding or equi-distantly toward each other for centering, mechanism for effecting such movement of the jaws, selectively conditionable means for controlling the operation of said mechanism, and signal controlled means for changing the last mentioned means directly from one jaw controlling condition to another.

15. In a linecasting and composing machine, a pair of line clamping jaws movable individually for quadding or concurrently for centering a line, means for controlling the movement of the jaws, and signal responsive means for changing the controlling means directly from one to another of its jaw controlling conditions.

16. In a linecasting and composing machine, a pair of line clamping jaws movable individually for quadding or concurrently for centering a line, means for controlling the movement of the jaws, means for maintaining said controlling means in

any controlling condition to which it is adjusted, and signal controlled means for changing the adjustment of the controlling means in opposition to the last mentioned means.

17. In a linecasting and composing machine, a pair of line clamping jaws movable individually for quadding or concurrently for centering a line, means for moving said jaws, means for selectively interconnecting said jaws and said moving means, and signal controlled means effective to change the interconnection between said jaws and said jaw moving means only upon a change in composition requirements.

18. In a linecasting and composing machine, a casting mechanism, a pair of matrix vise jaws capable of various conditions of operation, a control element having linear positions corresponding to said conditions of operation, electromagnetic operating means for moving said control element from any of its positions to any other one of said positions to vary said conditions of operation, and means actuated in accordance with the operation of said control element for varying the effectiveness of said electromagnetic operating means.

19. In a linecasting and composing machine, a pair of matrix controlling vise jaws capable of various conditions of operation, a control element having linear positions corresponding to said conditions of operation, means for shifting said control means to said positions selectively, electromagnetic means for operating said shifting means, and means actuated by said shifting means for preparing circuit paths for certain of said electromagnetic means alternatively.

20. In a linecasting and composing machine, a pair of line clamping jaws movable individually for quadding or concurrently for centering a line, jaw moving means, signal responsive control means, and means variable only in response to a jaw controlling signal presented to said signal responsive control means for connecting said jaw to said jaw moving means.

MAURUS T. GOETZ.