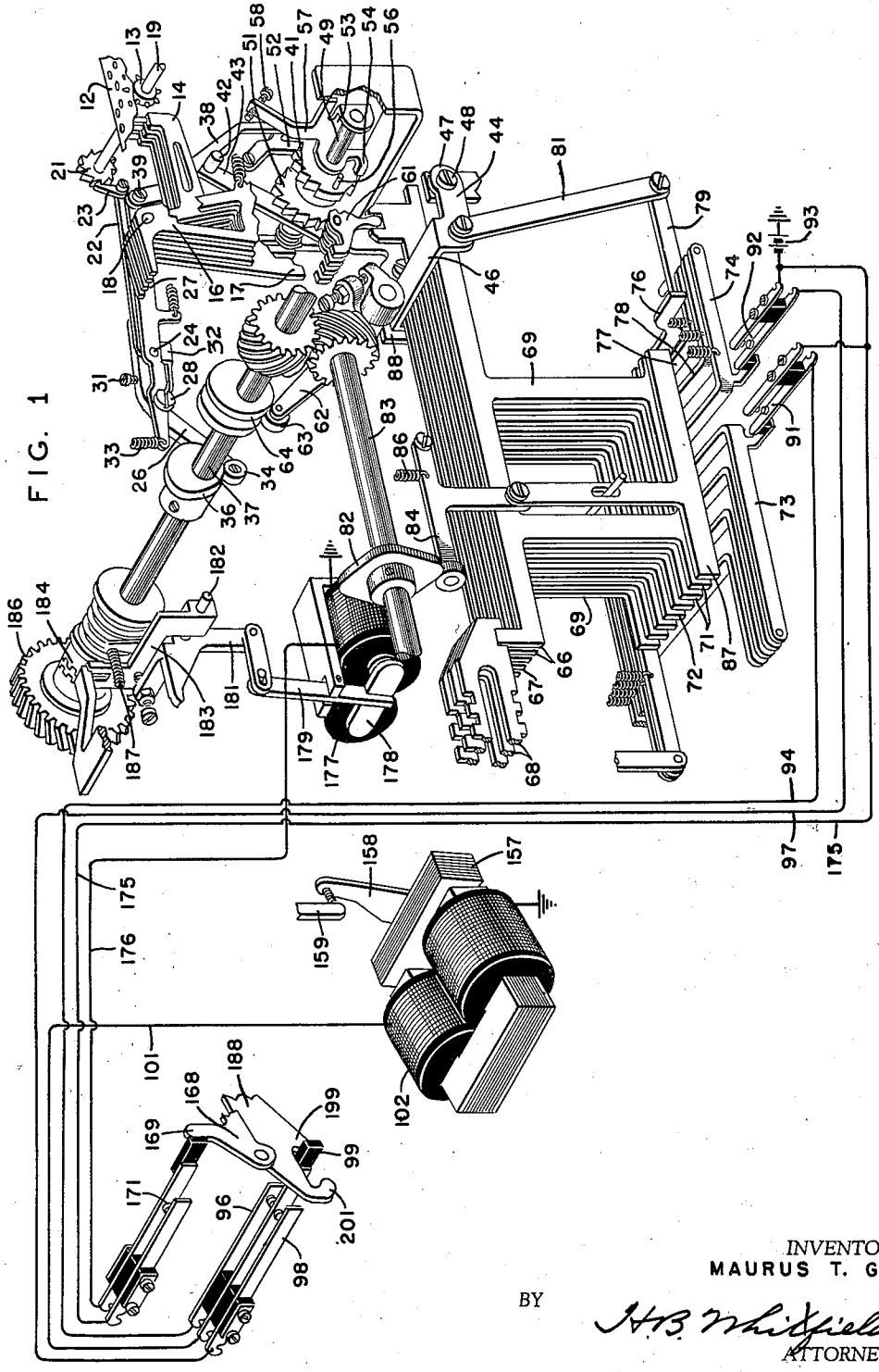
Feb. 17, 1942. M. T. GOETZ 2,273,032

DUAL MAGAZINE CONTROL

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FIG. 1



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DUAL MAGAZINE CONTROL

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FIG. 2

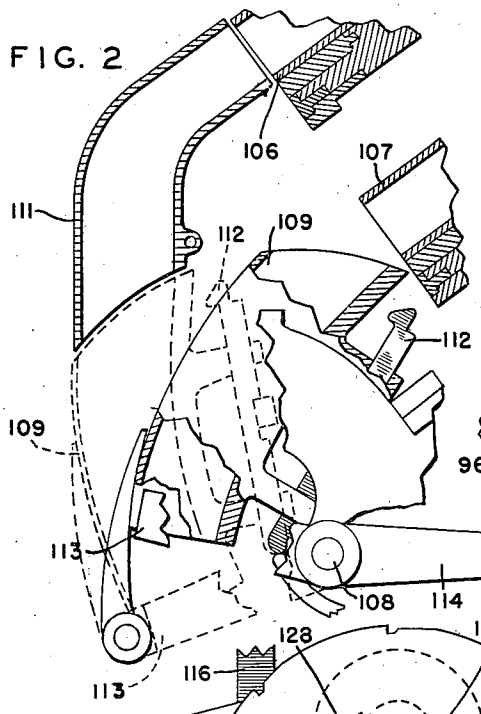


FIG. 4

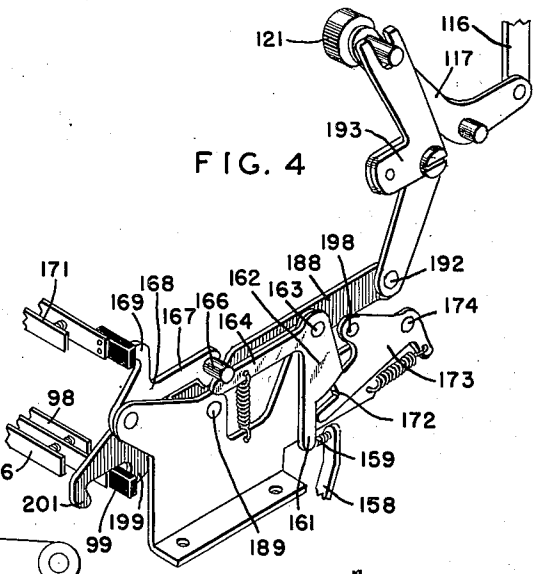


FIG. 5

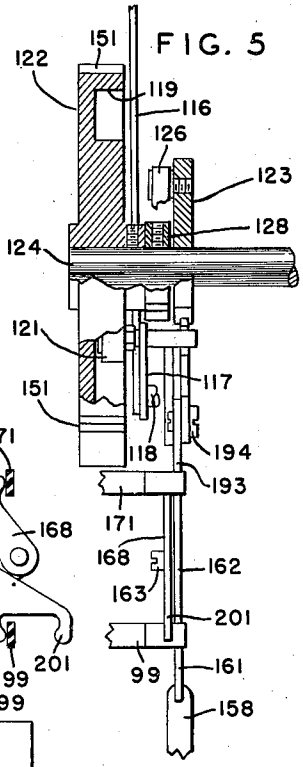
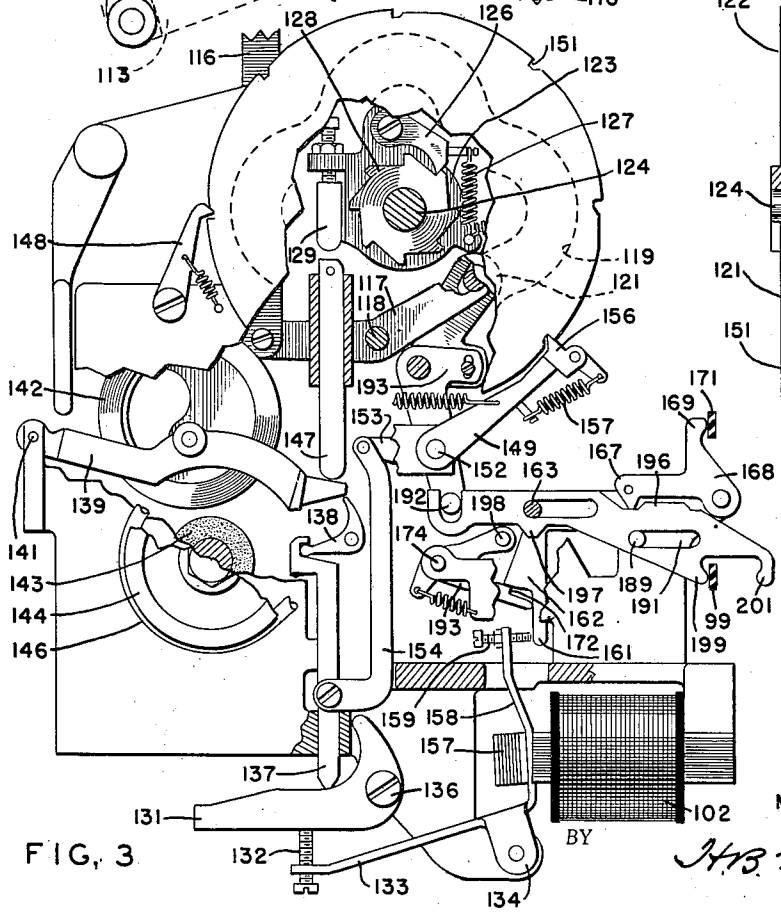


FIG. 3



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Patented Feb. 17, 1942

2,273,032

UNITED STATES PATENT OFFICE

2,273,032

DUAL MAGAZINE CONTROL

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

Application October 4, 1940, Serial No. 359,757

12 Claims. (Cl. 199—21)

This invention relates to linecasting and composing machines and particularly to the control of power operated magazine shift mechanism of such machines by a stored signal responsive apparatus.

Certain commercially available linecasting and composing machines are provided with mechanism operated by a power driven cam for establishing co-operation between the set of matrix release reeds and a pair of matrix storage magazines alternately, the control of the application of power to the cam being effected by a single key lever which is operable in a single direction to transfer the co-operation from an instant condition to the other condition without indication by or at the key lever of what condition prevails before or after the operation thereof.

An object of the invention is to provide an automatic control unit for a linecasting and composing machine responsive to stored signals having a simple electrical system for operating the single lever which controls the magazine shift mechanism of the linecasting and composing machine.

The invention features mechanical means for interrupting the presentation of stored signals upon the presentation and sensing of a magazine shift control signal for an interval to permit the matrix releasing mechanism to assume normal condition before the magazine shift operation occurs.

The invention also features electrical means for arresting the automatic control unit during the shifting operation to postpone further matrix releasing control selection until the desired relationship of release reeds to magazine has been established.

The invention further features means operated by the cam which effects the shift in the relationship of the release reeds to the magazine to transfer the control of the electrical apparatus which initiates the shift from one to the other of two selectable elements in the automatic control unit. The two elements pertain specifically to particular magazines.

The linecasting and composing machine to which the invention has been particularly adapted includes a plurality of matrix storage magazines, which may be two or more. If the machine includes more than two magazines, the magazines are usually shiftable manually as a group to bring any two adjacent ones in predetermined relation to a shiftable matrix channel entrance. The matrix channel entrance is shiftable into matrix receiving relation to either of the two magazines and is provided with slide bars which are always in operative relation to the single set of release reeds with which the machine is provided and which move into position, as the channel entrance is moved, to control the escapement mechanisms of the magazine with which the channel entrance is associated. The rocking of the matrix channel entrance from one to the other of its two positions is effected through a lever arm and link from a cam follower lever which has a follower member disposed in a channel cam. The channel is undulatory in contour and the cam is rotatable by engagement of a power driven pawl with a ratchet through a sufficient distance to move the cam follower from one extreme of the undulation of the channel to the other, thereby shifting the channel entrance from one to the other of its two positions. The pawl which operates the cam is oscillated by power mechanism controlled by a key lever, the pawl being oscillated through one cycle upon each depression of the key lever to effect advancement of the cam through one step.

According to the present invention an automatic control unit is associated with the linecasting and composing machine including mechanism for sensing signal combinations in a perforated tape and for selecting and actuating selectable members according to the signals sensed. The record sensing mechanism is provided with apparatus for arresting the advancement of the perforated tape for predetermined periods of time upon establishment of certain selective conditions, such as magazine shift, in order to allow time for matrices to escape entirely from the magazine and for release reeds to settle into normal position before a magazine shift operation is initiated.

Two of the selectable members are arranged to close electrical contacts, one contact pertaining to the presentation of the shiftable matrix channel entrance in association with one magazine and the other contact being associated with the presentation of the matrix channel entrance in co-operation with the other matrix storage magazine. An electromagnet is provided for controlling the power mechanism which the magazine shift key lever of the linecasting and composing machine controls, and a set of routing contacts is interposed between the electromagnet and the contacts controlled by the selectable members, for connecting the electromagnet to one or the other of the selector controlled contacts. A shiftable member for shifting the routing contacts to transfer the connection of the electro-

magnet is operated by the cam follower which shifts the matrix channel entrance. Thus the electromagnet cannot be operated repeatedly by successive closures of one of the selector controlled contacts, and the magazine shift mechanism cannot get out of step with the automatic control unit nor respond to any signal except that to present the shiftable matrix channel entrance in operative relation to a predetermined magazine. The electromagnet also operates a lever which closes a contact to complete a circuit for another electromagnet which operates to effect the disconnection of power from the automatic control unit to hold in abeyance all of its operations. The shiftable member which controls the routing contacts takes control of the contact for the stop magnet of the automatic control unit and holds those contacts closed until the shifting of the matrix channel entrance has been substantially completed, whereupon the contact opens and the stop magnet becomes de-energized to permit driving connection to be re-established to the automatic control unit, whereupon the sensing of the stored signals in the tape and the release of matrices proceeds.

For a full and complete understanding of the invention reference may be had to the following detailed description to be interpreted in the light of the accompanying drawings wherein:

Fig. 1 is a schematic perspective view of the tape sensing and selectable contact closing mechanism of an automatic control unit and of magazine shift control mechanism associated therewith in accordance with the present invention;

Fig. 2 is an elevational view partly in section and partly broken away showing the shiftable channel entrance mechanism of a linecasting and composing machine;

Fig. 3 is an elevational view partly in section and partly broken away showing the shiftable channel entrance operating mechanism of a linecasting and composing machine and also showing the selectably operable control mechanism for the shifting mechanism;

Fig. 4 is a perspective view showing the routing contact and stop magnet contact operating mechanism; and

Fig. 5 is an elevational view partly in section taken at the right of Fig. 3.

Referring now to the drawings and particularly to Fig. 1, the reference numeral 11 designates an automatic control unit for a linecasting and composing machine which may be of the type disclosed in Patent No. 2,098,973 granted November 16, 1937, to A. H. Reiber. The automatic control unit 11 includes a record reader mechanism for sensing the transverse rows of perforations in a control form or tape 12 and for intermittently advancing the control form 12 by means of the sprocket wheel 13 so as to present consecutively the transverse perforations to a position where they may be sensed cyclically by a set of feeler levers 14.

In the particular embodiment of the invention the apparatus has been arranged to accommodate a six-unit code system so that accordingly there are six feeler levers 14. An additional lever 16 generally similar to the levers 14 except that it is not provided with a tape sensing arm but only with the transfer projections 17 is supported intermediate the levers 14 upon a shaft 18. The tape feed sprocket 18 is mounted on a shaft 19 which also carries a ratchet wheel 21 that is rotated one tooth step at a time during the oscillational movement of lever 22 which carries the feed pawl 23. The tape feed lever 22 is pivoted at 24. Also pivoted at 24 is a cam follower lever 26 and a lever 27 which is secured to the lever 26 by screw 28. The cam follower lever 26 has extending therethrough an abutment screw 31. The tape feed lever 22 has at its left-hand end a laterally extending platform portion 32 which is disposed beneath the lower end of abutment screw 31. Cam follower lever 26 is biased in clockwise direction by spring 33 which engages the left-hand end of lever 27. Tape feed lever 22 is biased in clockwise direction by a spring (not shown) whereby its laterally extending platform portion 32 is urged into engagement with the lower end of abutment screw 31. A follower roller 34 carried by the left-hand end of lever 26 engages a cam 36 which is secured to shaft 37 to be hereinafter identified as the record reader operating shaft. Since the pivotal center of lever 26 coincides with that of lever 22 the movement imparted to lever 26 by cam 36 is communicated to the laterally extending platform portion 32 of lever 22 by adjustable abutment screw 31. When cam 36 rocks lever 26 and its extension lever 27 counterclockwise, lever 22 will also be rocked counterclockwise and when levers 26 and 27 are restored to extreme clockwise position by spring 33 the biasing spring (not shown) for lever 22 will also seek to return lever 22 to extreme clockwise position. It will be apparent that if lever 22 should be blocked in extreme counterclockwise position levers 26 and 27 may continue to oscillate about pivot 24 under the influence of cam 36 and spring 32. Under certain operating conditions of the apparatus tape feed lever 22 is blocked in extreme counterclockwise position and this condition will be described later.

A feed pawl 38 is pivoted at 39 to lever 27 and is arranged to engage the teeth of a ratchet wheel 41 when permitted to do so. Under ordinary conditions of operation the pawl 38 is withheld from engagement with ratchet 41 by a laterally extending pin 42 secured to one arm 43 of a cradle assembly 44 which also includes the transverse connecting member 46 and which is pivoted by opposed ears 47 upon trunnions 48 provided in the supporting structure.

Ratchet 41 is secured to a rock shaft 49 to which is also secured a ratchet 51. A check pawl 52 is normally held disengaged from ratchet 51 by pawl 38. Shaft 49 has pivotally mounted thereon a rocker member 53 which is provided with a projection 54 disposed in the path of a pin 56 carried by ratchet 41. Rocker member 53 is also provided with an upstanding arm 57 at the free end of which is an abutment screw 58. It will be apparent that as ratchet 41 is rocked counterclockwise by pawl 38 and is held in successive positions of advancement through the cooperation of check pawl 52 with ratchet 51, pin 56 carried by ratchet 41 will engage arm 54 of rocker member 53 and will move the rocker member in counterclockwise direction. Screw 58 is in alignment with nontape sensing lever 16 and upon being brought into engagement with lever 16 will rock the lever to extreme clockwise position.

The condition under which pawl 38 is permitted to move into engagement with the ratchet 41 is that cradle 44 and its arm 42 be rocked in counterclockwise direction. This results in movement of pin 42 carried by arm 43 out of engagement with pawl 38, and pawls 38 and 52

move into engagement with their respective ratchets 41 and 51. As fully disclosed in the previously identified patent to Albert H. Reiber, the tape feed lever 22 is provided near its right-hand end with a depending arm (not shown) which arm 43 of cradle 44 blocks when the cradle is in extreme counterclockwise position, whereby lever 22 is held in extreme counterclockwise position as previously mentioned, and tape 12 remains stationary while cam 36 continues to rock levers 26 and 27 to effect the advancement of ratchet 41.

Below each of the levers 14 and 16 a transfer lever 61 is pivotally carried by a transfer bail. Each transfer lever 61 is provided with spaced upstanding arms in such relation to the spaced depending arms 17 of the levers 14 and 16 that when a transfer lever 61 is moved upwardly into engagement with a lever 14 or 16 that is in extreme counterclockwise position, the transfer lever will be rocked in one direction, whereas when it is brought into engagement with a lever 14 or 16 that is in extreme clockwise position it will be rocked in the other direction. A transfer bail lever 62 having a cam follower roller 63 engaging a cam 64 carried by shaft 37 cyclically lifts the transfer levers 61 to bring them into engagement with the lower ends 17 of levers 14 and 16 whereby the transfer levers 61 are rocked into characteristic positions depending upon the permutational setting of tape sensing levers 14 and the position of lever 16 as determined by the ratchet feed mechanism comprising pawl 38, ratchet 41 and rocker member 53.

Each of the transfer levers 61 associated with the tape sensing levers 14 is articulated by a disc and notch connection to a code bar extension 66 and the transfer lever associated with the nontape sensing lever 16 is associated with an extension link 67 for a blocking bar. The code bar extension links 66 are individually connected to permutation code bars 68. In accordance with the presentation of the transfer levers 61 in extreme clockwise or counterclockwise position under control of the levers 14 and 16 the code bar extension links 66 and their code bars 68, the blocking bar extension link 67 and its blocking bar are presented in extreme right-hand or left-hand positions respectively. The blocking bar extension link 67 is normally presented in extreme left-hand position and remains in that position until nontape sensing lever 16 has been shifted to extreme clockwise position by rocker member 53 and the transfer bail has brought the transfer levers 61 into co-operation with the levers 14 and 16.

The code bar extension links 66 are provided with spaced depending arms 69 which have integral therewith or secured thereto auxiliary permutation code bars 71. The auxiliary code bars 71 may be notched permutationally along their lower edges and the notching may duplicate certain of the notchings of the code bars 68. The blocking bar extension link 67 is also provided with depending arms which carry a bar 72, the function of which is to block certain of the selective conditions which the auxiliary code bars 71 may be coded to establish.

The selectable elements controlled by the auxiliary code bars 71 are in the form of nested bails, of which bails 73 and 74 are examples, the bails being arranged for convenience in two groups.

A bail 76 which is positioned beyond the right-hand ends of the auxiliary bars 71 and 72 is pivoted on the same pivot as the right-hand group of bails and is provided with a forwardly extending portion which extends across certain of the bails such as the bails 77 and 78 in close proximity thereto. One of the last-mentioned bails is responsive to the same permutation code combination as one of the bails 73 and 74 and the other responds to the same code combination as the other of the bails 73 and 74. Auxiliary blocking bar 72 when in normal position blocks the bails 73 and 74 against selection but does not block the bails 77 and 78.

Bail 76 has a rightwardly extending arm 79 which is connected by link 81 to cradle 44. Upon the sensing by sensing levers 14 of a code combination in tape 12 for selecting one or the other of the bails 73 or 74, which will also cause the selection of one of the bails 77 and 78, the transfer bail operates and through the transfer levers 61 positions the code bar extension links 66, the code bars 68 and the auxiliary code bars 71 in permutational setting corresponding to that of the tape sensing levers 14. Thereupon a cam 82 on a shaft 83 which is geared to shaft 37 permits its follower lever 84 to rock in clockwise direction under the influence of biasing spring 86, thus lifting stripper bail 87 which in its lowermost position holds all of the selectable bails clear of the lower edges of the auxiliary code bars 71, and upon being lifted permits the bails to move into engagement with the lower edges of the auxiliary code bars. According to the assumption that one or the other of the bails 77 and 78 is to be selected, an alignment of notches will be presented to that bail by the auxiliary code bars 71 so that the bail can enter the alignment of notches. The auxiliary code bars 71 will also present an alignment of notches to that one of the bails 73 and 74 which is responsive to the same code combination as that one of the bails 77 and 78 which is assumed to be selected, but the bail 73 or 74 will be blocked by the auxiliary blocking bar 72 and will be prevented from entering the alignment of notches. As it moves clockwise to enter the alignment of notches the selected bail 77 or 78 engages the forwardly extending portion of bail 76 and rocks that bail clockwise, thus rocking cradle 44 counterclockwise to move its arm 43 out of restraining engagement with the pawl 38 and into blocking relation to the tape feed lever 22 which at this time is in its uppermost position. A latch 88 engages the transverse connecting member 46 of cradle 44 and holds the cradle in extreme counterclockwise position. Thus, the feeding of tape 12 is arrested and the advancement of ratchet 41 is initiated.

For each rotation of shaft 37 ratchet 41 is advanced one step and the transfer bail is operated, but since the tape feeding lever is blocked the tape sensing levers 14 continue to sense the same signal combination and no change is effected in the setting of the code bar extensions 66. Stripper bail 87 is oscillated for each revolution of shaft 37 but bail 76 is not under the control of stripper bail 87 and remains held in extreme clockwise position due to the latching of cradle 44.

After the ratchet 41 has been actuated sufficiently to cause rocker member 53 to shift nonsensing lever 16 the transfer levers, upon the next operation of the transfer bail, find a different condition than previously encountered; namely, the clockwise presentation of lever 16. This results in the shifting of blocking bar link 67 to its right-hand position. Immediately there-

after cam 82 permits stripper bail 87 to rise and whereas that one of the bails 77 and 78 which initiated the operation of the ratchet 41 is now blocked, due to the presentation of the auxiliary blocking bar 72 in right-hand position, the bail 73 or 74 which had been blocked out of a full alignment of notches is now no longer blocked and enters the alignment of notches.

As fully disclosed in the hereinbefore identified patent, the blocking bar link 67 is provided with means for disengaging latch 88 from cradle 44. This permits the cradle to return to its extreme clockwise position out of blocking relation to tape feeding lever 22 so that tape feeding may be resumed. At the same time arm 43 of cradle 44 withdraws feed pawl 38 and check pawl 52 from engagement with ratchets 41 and 51, respectively, and the ratchets are restored by a torsion spring to normal position. It will thus be apparent that the bail 73 or 74 may be selected after a delayed interval depending upon the number of steps through which ratchet 41 rotates, the tape feeding mechanism being disabled during this interval.

Instead of providing for the selection of one of the two bails 77 and 78 in response to the code combination for the selection of the bail 73 and for the selection at the other of the two bails 77 and 78 in response to the code combination for the selection of the bail 74, the auxiliary code bars 71 may be coded so as to select one only of the bails 77 and 78 in response to the codes for both of the bails 73 and 74. The manner in which this may be accomplished is fully disclosed in the patent to A. H. Reiber. With this arrangement the other of the bails 77 and 78 is made available for the initiation of tape feed arrestment and function selection delay in connection with some other function.

As shown in Fig. 1, each of the bails 73 and 74 is arranged to close a pair of contacts, those associated with bails 73 being designated by the reference numeral 91 and the other pair being designated 92. One contact of each of the contact pairs 91 and 92 is connected to battery 93. The other contact of the pair 91 is connected by conductor 94 to a routing contact 96 and the other contact of the pair 92 is connected by conductor 97 to routing contact 98. A contact 99 is movable between the contact tongues 96 and 98 to engage one or the other of them under the control of the magazine shifting mechanism of the linecasting and composing machine, as will be described hereinafter. Contact tongue 99 is connected by conductor 101 to one terminal of the winding of a magazine shift initiating electromagnet 102, the other terminal of which is connected to ground.

When bail 73 is actuated after the delay interval initiated by the bail 77 or 78 which is selectable in response to the same signal combination, contacts 91 are closed to connect battery 93 over conductor 94 to contact 96. If contact tongue 99 is then in engagement with contact 96 the battery circuit will be extended to electromagnet 102 which will become energized. However, if contact tongue 99 is then in engagement with contact 98 the closure of contacts 91 will be idle, as the circuit to electromagnet 102 cannot be completed through contact 96. Under these circumstances the only way to effect the energization of electromagnet 102 is to select bail 74 and close contacts 92. Thus, the routing contact tongue 99 determines which of the contacts 91 and 92 can effect energization of the electromagnet 102.

Referring now to Fig. 2 the reference numerals 106 and 107 designate the upper and lower, respectively, of a pair of adjacent magazines in a linecasting and composing machine. Below the foremost ends of the magazines 106 and 107 is pivotally mounted at 108 a matrix channel entrance member 109 which when it occupies its extreme clockwise position, which is the full line position shown in Fig. 2, registers with the lower magazine 107 and when in extreme counterclockwise position which is the dotted line position it registers with the supplementary matrix guide 111. Pivotally movable channel entrance member 109 is provided with slides 112, the lower ends of which are in operative relation to the release reeds (not shown) of the linecasting and composing machine regardless of which of the two positions the channel entrance member 109 occupies. The upper ends of the slides 112 cooperate with the escapements for the particular magazine with which pivoted channel entrance member 109 co-operates. The pivotal mounting of channel entrance member 109 upon pivot 108 is by means of forwardly extending arms 113 and in invariable relation to one of the arms 113, whether by being secured thereto or by being fixed to pivot shaft 108 and having the arms 113 also fixed to shaft 108, is a rearwardly extending arm 114 from which pivotally depends a link 116.

As shown in Fig. 3 the lower end of link 116 is pivotally connected to the foremost end (left-hand end) of a cam follower lever 117 pivoted at 118. At its right-hand end, as viewed in Fig. 3, the cam follower lever 117 supports a roller 121 which is disposed in a cam groove 119 in the side of a cam member 122. The cam groove 119 has four points of maximum distance from the center of the cam and between each two such points is a point of minimum radius so that upon each one-eighth revolution the cam follower lever 117 will be rocked from one to the other of its two extreme positions. Thus, in Fig. 3 the cam follower lever 117 is shown in extreme counterclockwise position, link 116 is in its lowermost position, and in Fig. 2 the shiftable channel entrance member 109 is shown in full line position in registry with the lower magazine 107. Upon rotation of cam 122 one-eighth of a revolution cam follower lever 117 will be rocked to extreme clockwise position, link 116 will be lifted to its uppermost position, and shiftable channel entrance member 109 will be rocked to its dotted line position, Fig. 2. Upon the next one-eighth revolution of cam 122, the cam follower lever 117 and link 116 will be restored to the position shown in the drawings and the shiftable channel entrance 109 will be restored to the full line position.

Rotation in one-eighth revolution steps is imparted to cam 122 by a rocker plate 123 pivoted upon shaft 124 to which cam 122 is secured. Rocker plate 123 has pivoted thereon a pawl 126 which is urged by spring 127 into engagement with ratchet 128 secured to shaft 124. Rocker plate 123 has secured thereto an adjustable abutment member 129 by which rocking movement may be imparted to rocker plate 123 as will presently appear.

The linecasting and composing machine is provided with a lever 131 which may be rocked in clockwise direction, as viewed in Fig. 3, by a manually operated key lever (not shown) or by abutment screw 132 carried at the end of arm

133 of armature lever 134 of the electromagnet 102. Lever 131 is pivoted at 136 and is engaged by the lower end of a reciprocable rod 137. At its upper end rod 137 is articulated to trigger lever 138 which normally supports the right-hand end, as viewed in Fig. 3, of a yoke 139 pivoted at 141. Yoke 139 rotatably supports a keyboard cam or eccentric 142. Below the cam 142 is a rubber roller 143 which is continuously rotated by pulley 144 driven by belt 146.

In the normal condition of the apparatus described in the foregoing paragraph, trigger lever 138 holds cam yoke 139 in extreme counterclockwise position, in which position cam 142 is held clear of rubber roller 143. In this position a reciprocable rod 147 rests or substantially rests upon yoke 139 and its upper end engages member 129 of rocker plate 123 or fails to engage it by a reasonable clearance but is substantially in coaxial alignment with it. Upon the rocking of lever 131 in clockwise direction rod 137 is lifted vertically to rock trigger 138 out of supporting relation to yoke 139 thereby permitting cam 142 to drop into engagement with rubber roller 143. The point of the periphery of cam 142 which first engages rubber roller 143 is substantially the point of minimum radius, and as roller 143 imparts rotation to cam 142 due to frictional engagement therewith, yoke 139 is rocked counterclockwise, thus moving reciprocable rod 147 upwardly, the rod in turn engaging abutment member 129 of rocker plate 123 and rotating ratchet 128 and cam 122 in clockwise direction. When rubber roller 143 has rotated cam 142 sufficiently to rock the yoke 139 to its extreme counterclockwise position, the yoke has imparted one-eighth revolution to cam 122 and the right-hand end of the yoke has been brought well above the free end of the upstanding arm of trigger lever 138. If lever 131 has been permitted to return to its extreme counterclockwise position during the rotation of cam 142 trigger lever 138 will have returned to normal position where it can arrest yoke 139 as it moves clockwise to its normal position which is the position shown in Fig. 3.

For accurate determination of the stop position of cam member 122, pawls 148 and 149 are provided. Pawl 148 is in the nature of a spring biased jockey or detent pawl and it determines the rest positions of cam member 122. It is merely cammed out of engagement with any one of the eight notches 151 in cam member 122 as the cam member is rotated by rocker plate 123. Pawl 149 is fixed to rock shaft 152 which also has secured thereto an arm 153 connected by link 154 to reciprocable rod 137. Pawl 149 is provided with a yieldable pivoted head 156 which may yield slightly as the head 156 enters a notch 151 at the end of a cam feeding operation, thus avoiding sudden arrestment of cam member 122. Biasing spring 157 for pawl head 156 restores the head to normal relative to pawl 149 if cam member 122 has overtraveled slightly, thus aiding detent pawl 148 to determine the exact position in which cam member 122 shall remain after being operated. By virtue of the association of pawl 139 with lever 131 through rock shaft 152, arm 153 and link 154, the lever 131 not only trips trigger lever 138 but also withdraws pawl 149 from engagement with a notch 151 of cam member 122, thus freeing the cam for rotation.

It will be apparent from the foregoing that since lever 131 is operated by arm 133 of armature lever 134 of electromagnet 102, which in turn is energized through contacts 91 or 92, the cam member 122 will be rotated one-eighth revolution in response to operation of the proper contact 91 or 92 as determined by the routing contact 99. Armature lever 134 has secured thereto the armature 157 and is also provided with an arm 158 which carries at its free end abutment screw 159. Referring now to Figs. 3 and 4 it will be observed that abutment screw 159 operatively engages depending arm 161 of a bell crank lever 162. Bell crank 162 is pivoted at 163 and has the free end of its other arm 164 disposed under a pin 166 extending laterally from the free end of one of the arms 167 of a bell crank lever 168, the other arm 169 of which engages one of a pair of contacts 171. Co-operating with the bell crank lever 162 there is a latching lever 173 pivoted at 174 and spring biased to engage bell crank 162. Latch lever 173 is undercut at 172 to provide a shoulder, and when bell crank 162 is rocked counterclockwise as viewed in Fig. 3 by armature lever arm 158 to impart clockwise movement to bell crank lever 168 through pin 166 and thus to close contacts 171, shoulder 172 moves into the path of the right-hand side of bell crank 162 and prevents the bell crank from returning to normal position after magnet 102 becomes de-energized. Thus, a lock is provided to hold the contacts 171 closed.

Referring now to Fig. 1 it will be seen that one of the contacts 171 is connected to conductor 175 which extends to battery 93 and that the other of the contacts 171 is connected by conductor 176 to one end of the winding of an electromagnet 177, the other end of which is connected to ground. Magnet 177 has an armature 178 carried by an armature lever 179 connected by link 180 to bell crank 181. Bell crank 181 is pivoted on shaft 182 which also pivotally supports clutch disengaging lever 183 for clutch 184 through which rotation is imparted from gear 186 to shaft 37. When magnet 177 becomes energized and attracts its armature 178, bell crank 181 is rocked clockwise as viewed in Fig. 1 to rock clutch disengaging lever 183 in the same direction to effect disengagement of the driven element of clutch 184 from the driving element, whereby shaft 37 is arrested. Spring 187 opposes the presentation of clutch disengaging lever 183 in position to arrest shaft 37, but magnet 177 overcomes spring 187. However, when magnet 177 becomes de-energized due to the separation of contacts 171, spring 187 retracts clutch disengaging lever 183 to ineffective position, whereby the elements comprising clutch 184 are permitted to re-engage and shaft 37 is restarted. Since the closure of contacts 171 is effected by armature lever 134 of electromagnet 102 which also operates lever 131 to initiate an operation of cam member 122 to effect shifting of matrix channel entrance member from one to the other of its two positions, it will be apparent that shaft 37 will be arrested simultaneously with the initiation of the operation which effects the feeding of cam member 172. The purpose of such arrestment is to prevent the sensing of matrix releasing combinations in tape 12 and the initiation, through code bars 68 (Fig. 1), of matrix releasing operations while the channel entrance member 109 is being shifted from one to the other of its two positions.

As shown in Figs. 3 and 4, a routing contact and record reader arresting control member 188 is slidably supported upon the pivot pin 163 and

upon pin 189 by slots 191. At its left-hand end, as viewed in Fig. 3, slide member 188 is provided with an aperture in which is disposed a laterally extending pin 192 carried by the depending arm of a cam follower bell crank 193 pivoted at 194 and having the free end of its upper arm slotted to engage the pin by which cam follower roller 121 is carried upon cam follower lever 117. With the cam follower lever 117 in the position shown in Fig. 3, lever 193 is in its extreme counterclockwise position and slide member 188 is in its extreme right-hand position. When cam member 122 is rotated one-eighth revolution to rock cam follower lever 117 to extreme clockwise position cam follower lever 193 is also rocked to extreme clockwise position and slide member 188 is shifted to its left-hand position.

On its upper edge the slide member 188 is provided with a cam projection 196 which moves from one side to the other of the left-hand end of arm 167 of bell crank 168 as slide member 188 moves from one to the other of its two positions. The purpose of cam projection 196 is to hold bell crank 168 in its extreme clockwise position, as viewed in Fig. 3 (counterclockwise position as viewed in Fig. 4), whereby to assume control of bell crank 168 immediately after slide 188 begins to move and to relinquish control over bell crank 168 just before slide 188 comes to rest. Slide member 188 is provided on its lower edge with a cam projection 197 which moves from one side to the other of a pin 198 carried by latch 173 as slide 188 moves from one to the other of its two positions. The function of cam projection 197 is to rock latch 173 in clockwise direction sufficiently to free bell crank 162 from shoulder 172 of latch 173. Thus, bell crank 162 is relieved of control over bell crank 168 and the contacts 171, but by the time that latch 173 has been disabled the cam projection 196 on the upper edge of slide member 188 has assumed control of bell crank 168 and prevents magnet 177 (Fig. 1) from becoming de-energized until slide member 188 has reached substantially the limit of its travel, at which time the shifting of matrix chanel entrance member 109 has been substantially completed and the linecasting and composing machine is in condition to accommodate matrix release operation so that the restarting of record reader shaft 37 is proper.

The slide member 188 is also provided at its lower edge, near the right-hand end thereof, as viewed in Fig. 3, with a pair of fingers 199 and 201 disposed respectively at the left and right-hand sides of routing contact tongue 99. When slide member 188 is presented in its right-hand position, which is the position shown in Fig. 3, finger 199 holds the routing contact tongue in its extreme right-hand position, or as viewed in Fig. 1, in its left-hand position in engagement with contact 96. When slide member 188 is moved to its left-hand position, as viewed in Fig. 3, finger 199 moves out of engagement with routing tongue 199 and finger 201 moves into engagement with it and shifts the contact tongue to its extreme left-hand position, or as viewed in Fig. 1, to its right-hand position in engagement with contact 98.

From the foregoing it will be apparent that the mechanism which effects the shifting of the matrix channel entrance member 109, namely, the cam member 122, controls the shifting of the routing contact tongue 99. If the auxiliary code bars 71 are set in accordance with a magazine shift signal which is identical with the last previous magazine shift signal, and select that one of the bails 73 and 74 which was last operated, the magnet 102 will not become energized because the circuit to it is open at the routing contact tongue 99, having previously been opened by the slidable member 188 when the cam member 122 was last operated. Therefore, neither the lever 131 nor the bell crank 162 which controls the contacts 171 will be operated, and a magazine shift operation will not be initiated, nor will the record reader shaft 37 be arrested. Should the apparatus not include the routing contact tongue 99 and the fingers 199 and 201 carried by slidable member 188, the magazine shift initiating magnet 102 would respond to every magazine shift signal of either type and the second of two successive identical magazine shift signals would cause the matrix channel member 109 to shift from the position corresponding to the first of the two identical signals to a position corresponding, not to the second of the two identical magazine signals, but to the position corresponding to the other different magazine shift signal. The magazine shift mechanism comprising the cam 122 and the matrix channel entrance member 109 would then be out of step with the selector mechanism shown in Fig. 1, and the magazine selection would thereafter be crossed or reversed until brought into correct relation by another magazine shift signal identical with the two or by two successive ones of the different type of magazine signal.

It will also be apparent that while the record reader shaft 37 is not arrested when the bail 76 is operated by one of the bails 77 and 78 but continues to operate to effect feeding of the ratchet 141, and incidentally, idle repeated sensing of the signal combination presented to the sensing levers 14 due to blocking of the tape feeding mechanism by arm 43 of bail 46, upon the energization of magnet 102 in response to the closure of the correct ones of the contacts 91 and 92 relative to the position of routing contact tongue 99 the clutch 184 becomes disengaged by operation of magnet 177, initially under the control of bell crank 162, and thereafter under the control of slidable member 188, and remains arrested, interrupting all tape feeding, tape sensing and signal transferring operations, until the shifting of matrix channel entrance member 109 is substantially completed. The first delay or interruption of matrix release operations which results from the selection of bail 76 affords an interval in which any matrices then in process of being released may fall clear of the magazines 106 and 107 and of the matrix channel entrance member 109, so that they shall not interfere with the shifting of the channel entrance member 109 and so that matrix release reeds involved in the release of such matrices may settle to their normal position and permit the matrix release slides 112 to settle so that they will not interfere with the shifting of matrix channel entrance member 109. The interruption in matrix releasing operations afforded by the operation of magnet 177 and the disengagement of clutch 184 insures that no attempt shall be made by the selector mechanisms to initiate a matrix release operation while the channel entrance member 109 is being shifted and until it has reached a rest position.

Although a specific embodiment of the in-

vention has been shown in the drawings and described in the accompanying specification, it is to be understood that the invention is not limited to such specific embodiment but is capable of modification and rearrangement without departing from the spirit of the invention and within the scope of the appended claims.

What is claimed is:

1. In a linecasting and composing machine having a plurality of matrix storage magazines and a shiftable matrix releasing and receiving device for co-operation with said magazines individually, a cam for shifting said device, means for driving said cam, means for establishing an operative connection between said driving means and said cam, means for operating said connection establishing means, a plurality of selectable means for controlling said operating means, signal responsive means for selecting said selectable means individually, means controlled by said cam for qualifying alternatively said selectable means to control said operating means, and means controlled jointly by said operating means and said qualifying means for arresting said signal responsive means to accommodate the shifting of said shiftable device.

2. In a linecasting and composing machine having a plurality of matrix storage magazines and a shiftable matrix releasing and receiving device for co-operation with said magazines individually, a cam for shifting said device, means for driving said cam, means for establishing an operative connection between said driving means and said cam, means for operating said connection establishing means, selectable means for controlling said operating means, signal responsive means for selecting said selectable means, and means controlled by said operating means for arresting said signal responsive means to accommodate the shifting of said shiftable device.

3. In a linecasting and composing machine, a plurality of matrix storage magazines, a shiftable matrix releasing device for co-operation with said magazines individually, means for shifting said device, means for driving said shifting means, means for establishing an operative connection between said driving means and said shifting means, means for operating said connection establishing means, selectable means for controlling said operating means, signal responsive means for selecting said selectable means, means controlled by said operating means for arresting said signal responsive means, and means for prolonging the arrestment of said signal responsive means to accommodate the shifting of said shiftable device.

4. In a linecasting and composing machine, a plurality of matrix storage magazines, a shiftable matrix releasing device for co-operation with said magazines individually, means for shifting said device, means for driving said shifting means, means for controlling said driving means, means for operating said controlling means, signal responsive means for selecting said operating means, means also controlled by said operating means for arresting said signal responsive means, and means for prolonging the arrestment of said signal responsive means to accommodate the shifting of said shiftable device.

5. In a linecasting and composing machine, a plurality of matrix storage magazines, a shiftable matrix releasing device for co-operation with said magazines individually, means for shifting said device, means for controlling said shifting means, signal responsive means for selecting said controlling means, means also controlled by said controlling means for arresting said signal responsive means, and means for prolonging the arrestment of said signal responsive means to accommodate the shifting of said shiftable device.

6. In a linecasting and composing machine having a plurality of matrix storage magazines to be rendered effective selectively, means for selecting the magazines individually, power actuated means for operating said magazine selecting means, means for initiating the operation of said power actuated means, a plurality of selectable members for controlling said operation initiating means, selector means for selecting said selectable members individually, stored signal sensing means for controlling said selector means, means for presenting stored signals successively to said sensing means, means responsive to the signals assigned to said selectable members for interrupting said signal presenting means, means for transferring the control over said operation initiating means from one to the other of said selectable members, means operated by said magazine selecting means for controlling said transferring means, and means associated with the last mentioned means for determining the restarting of said signal presenting means to accommodate the selection of a magazine.

7. In a linecasting and composing machine having a plurality of matrix storage magazines to be rendered effective selectively, means for selecting the magazines individually, power actuated means for operating said magazine selecting means, means for initiating the operation of said power actuated means, a plurality of selectable members for controlling said operation initiating means, signal responsive means for selecting said selectable members individually, means for presenting stored signals successively to said signal responsive means, means responsive to the signals assigned to said selectable members for interrupting said signal presenting means, means controlled by said operation initiating means for arresting said signal responsive means, means for transferring the control over said operation initiating means from one to the other of said selectable members, means operated by said magazine selecting means for controlling said transferring means, and means associated with the last mentioned means for determining the restarting of said signal presenting means and said signal responsive means to accommodate the selection of a magazine.

8. In a linecasting and composing machine having a plurality of matrix storage magazines to be rendered effective selectively, means for selecting the magazines individually, power actuated means for operating said magazine selecting means, means for initiating the operation of said power actuated means, a plurality of selectable members for controlling said operation initiating means, signal responsive means for selecting said selectable members individually, means controlled by said operation initiating means for arresting said signal responsive means, means for transferring the control over said operation initiating means from one to the other of said selectable members, means operated by said magazine selecting means for controlling said transferring means, and means associated with the last mentioned means for determining the restarting of said signal responsive means to accommodate the selection of a magazine.

9. In a linecasting and composing machine having a plurality of matrix storage magazines

to be rendered effective selectively, means for selecting the magazines individually, power actuated means for operating said magazine selecting means, means for initiating the operation of said power actuated means, a plurality of selectable members for controlling said operation initiating means, signal responsive means for selecting said selectable members individually, means controlled by said operation initiating means for arresting said signal responsive means, and means controlled by said magazine selecting means for transferring the control over said operation initiating means from one to the other of said selectable members.

10. In a linecasting and composing machine having a plurality of matrix storage magazines to be rendered effective selectively, means for selecting the magazines individually, an electromagnetic means for controlling the operation of said magazine selecting means, a plurality of selectable members for controlling said electromagnetic means, signal responsive means for selecting said selectable members individually, and means controlled by said magazine selecting means for transferring the control over said electromagnetic means from one to the other of said selectable members.

11. In an automatic control device, signal presenting means, selector means responsive to presented signals, means controlled by said selector means for interrupting the signal presenting means, means also controlled by said selector means for initiating operations, means also controlled by said selector means and operable as an incident to the control of said operation initiating means for conditioning said signal presenting means to be restarted, and means controlled by said operation initiating means for disabling said selector means and said signal presenting means to accommodate the initiated operation.

12. In an automatic control device, signal presenting means, selector means responsive to presented signals, means controlled by said selector means for interrupting the signal presenting means, means also controlled by said selector means for initiating operations, means also controlled by said selector means and operable as an incident to the control of said operation initiating means for conditioning said signal presenting means to be restarted, means controlled by said operation initiating means for disabling said selector means and said signal presenting means to accommodate the initiated operation, and means operable as an incident to completion of the initiated operation for restarting said signal presenting means and said selector mechanism.

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