

July 12, 1938.

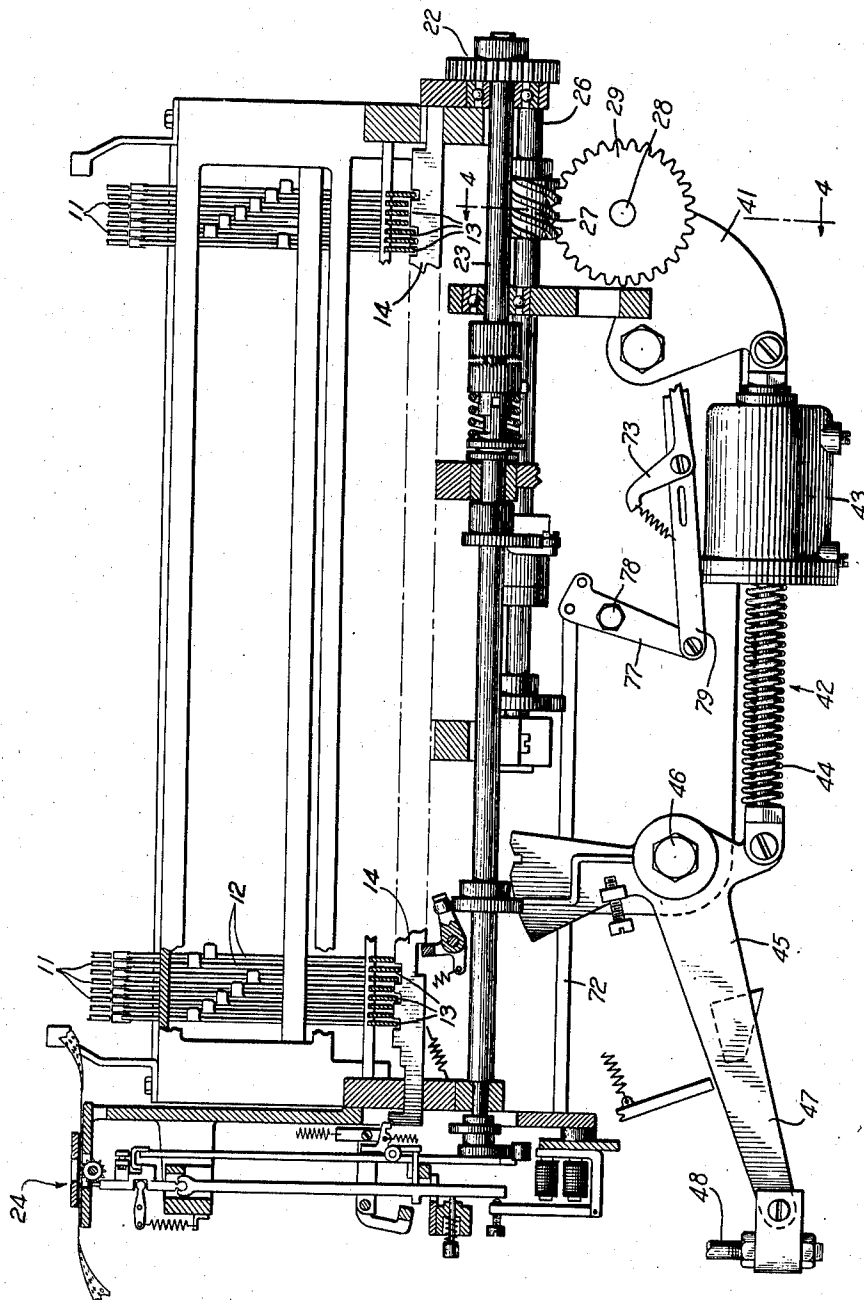
L. M. POTTS

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LINE CASTING AND COMPOSING MACHINE

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FIG. 2



INVENTOR
LOUIS M. POTTS

BY *H. B. Whitfield*
ATTORNEY

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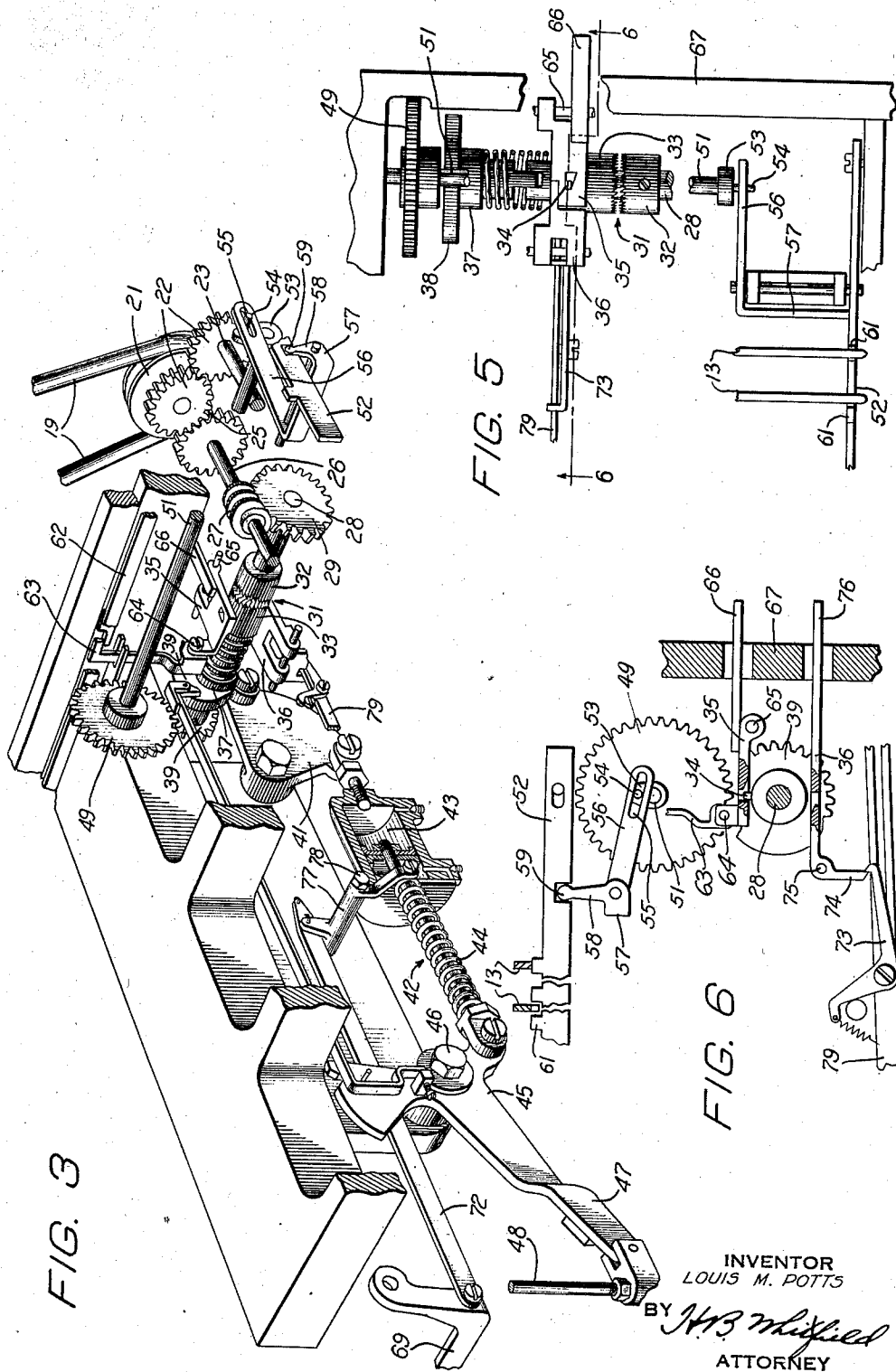
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UNITED STATES PATENT OFFICE

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LINE CASTING AND COMPOSING MACHINE

Louis M. Potts, Evanston, Ill., assignor, by mesne assignments, to Teletypesetter Corporation, a corporation of Delaware

Original application January 2, 1932, Serial No. 584,387, now Patent No. 2,057,652, dated October 13, 1936. Divided and this application May 5, 1934, Serial No. 724,025

24 Claims. (Cl. 199—24)

The present invention relates to linecasting and composing machines and more particularly to selecting mechanisms adapted to be used in conjunction with automatic control units for operating such machines. This application is a division of copending application Serial No. 584,387, filed January 2, 1932 which has matured into Patent No. 2,057,652, granted October 13, 1936.

In standard structures of commercially well-known linecasting and composing machines there are provided storage magazines having pluralities of storage channels each of which receives a predetermined number of slug casting matrices.

The length of these channels being limited in accordance with standard construction practices and the matrices being received in said channels endwise, a certain maximum number of said matrices may be supported in each channel.

While this number is generally ample for ordinary requirements and in connection with the majority of characters, in their frequency of occurrence it has been found, nevertheless, that in the case of some characters, particularly lower case E and tabulation dots, the requirements of certain lines of composition frequently exceed the supply that may be availed of through the capacity of a single channel of said magazines. More often the available supply of these frequently used matrices is ample for nearly all lines of composition, but since it is possible to have two or three lines of composition assembled at one and the same time in various stages of the slug composing and casting operations, it is more often found that the available supply of certain more frequently used matrices while ample for any single line of composition is inadequate for supplying two or three lines.

To accommodate for such a condition, it has been the practice to allot more than one channel for the storage of such characters and to release the matrices bearing such characters alternately from each of several related channels (usually two) in accordance with a predetermined selective succession. While this problem has been known and has been thus remedied in accordance with manual linecasting and composing machine manipulation, it is somewhat more involved when considered with automatic line composition in accordance with stored signals where alternative channel selection is to be made automatically. The inadequacy of certain frequently employed character matrices that may be obtained from but a single matrix channel is a more pronounced condition when considered in the light of auto-

matic line composition for the greater speed inherent thereto tends to maintain, at nearly all times, several composed lines of matrices in different stages of the composing and casting cycle. This requires a larger available supply of matrices, particularly of those classes whose natural or special frequency of occurrence is extraordinarily greater.

It is accordingly an object of the present invention to provide a simple, reliable, and efficient apparatus adaptable to automatic line composition to select predetermined characters from alternate ones of several related matrix storage channels.

For the sake of brevity, commercially well-known linecasting and composing machines will be referred to hereinafter generally as principal machines; the auxiliary mechanisms illustrated and described in the above mentioned parent patent will be referred to as control units, and the essential elements which constitute the present invention will be referred to generally as double E or multi-channel shifting apparatus.

Briefly, the present invention contemplates the provision of a pair of similarly coded selector elements and an additional modified code bar, the positionment of which is cyclically controlled so as to block the selection of one or another of each of said pairs of selectable elements whereby but a predetermined one of the pair may respond to their common selecting signal and where the shifting from one channel to the other is accomplished periodically so as to afford access to both storage channels and in this way to a larger number of available matrices.

It is proposed, in accordance with the preferred embodiment of this invention, to control periodically the shifting of the aforementioned apparatus cyclically in accordance with each line of composition and under associative control of the assembly elevator. Towards this end the shifting apparatus is being illustrated and described herewith in association with an operating shaft which initiates the performance of the assembly elevator. It will be understood, of course, that this interrelation is arbitrary and is suggested by way of example only, and that feasibly the shifting may be accomplished under the control of any other periodically operating organ that may be incorporated in the control unit.

For a more comprehensive understanding of the present invention, reference should be had to the accompanying drawings and to the following detailed specification in which like reference characters denote similar parts throughout.

In the accompanying drawings,

Fig. 1 is a perspective view of a linecasting and composing machine illustrating an automatic control unit embodying certain features of the present invention applied thereto;

Fig. 2 is a front elevational view partially in section having certain portions of the principal machine broken away for the sake of simplicity in illustration;

Fig. 3 is a fragmentary perspective view of a portion of the mechanism illustrated in Fig. 1, featuring the present invention applied thereto;

Fig. 4 is a transverse sectional view taken approximately on line 4—4 of Fig. 2;

Fig. 5 is a detailed plan view of the structure featuring the present invention, and

Fig. 6 is a detailed transverse sectional view of a portion of the mechanism embodied in the present invention and may be located upon the section line 6—6 taken on Fig. 5.

The reference characters 11 indicate generally a set of matrix release reeds, which, as illustrated in Fig. 2, symbolizes the composing mechanism of the principal machine. These reeds are individually actuated by associated weight bars 12 (Fig. 4), which are selectively conditioned by horizontally moving selectable elements 13, one of which is associated with each bar 12. At their left extremity, as viewed in Fig. 4, the elements 13 are notched to cooperate with variously coded notches and lugs that are provided in a set of code bars 14. Upon each conditioning of the several code bars 14 there is presented a transverse row of notches which affords a clearance to one of the elements 13 and permits the latter element to respond to the urge of an individual spring 15 associated therewith. The code bars 14 are variously placed or conditioned through the instrumentality of transfer elements which in turn receive their setting from a set of feelers located in the record reader 24. After each setting, the selected one of the elements 13 is restored by the cyclic operation of a return bail 20, the operation of which is suitably timed as described in the parent patent referred to above. Bail 20 is provided with a longitudinally extending lip with which it engages the shoulder 10 of any of the elements or bars 13 when the latter is found in selective condition. When one of the selectable elements 13 is selectively conditioned, it displaces the bar 12 associated with it, presenting the latter into a position as illustrated in dotted lines in this figure, whence it may be engaged by a periodically reciprocating bail member 16 which imparts a vertical thrust thereto. Through the instrumentality of bar 12, this motion is communicated to the release reed 11, thereby causing the release of an associated matrix supported in a storage magazine 17.

Matrix storage magazine 17 is provided with a plurality of channels 18 within each of which there resides, in endwise alignment, a plurality of matrices of a certain character. In accordance with the well-known system of matrix distributors, these matrices are released and assembled for line composition after which they are transferred to a slug casting chamber. Thence they are elevated to a distributing mechanism where, in accordance with certain notched characteristics peculiar to each matrix, they are restored to the channel from which they originate.

As indicated above, it has been found, during the composition of certain matter particularly in

the case of extra width columns, that the frequency of occurrence of certain alphabetical characters such as, for example, the lower case E and in the case of other characters such as periods, etc., may exhaust the supply of matrices that can be availed of by the capacity of a single channel 18. To supply such frequently occurring characters, it has been proposed to allot several channels 18 for their accommodation and in this manner to increase the storage capacity for those certain matrices only, while maintaining for others the normal available supply afforded by but a single storage channel. The channels 18 are formed in substantially parallel alignment in the matrix magazine 17 and in accordance with the versatility afforded as a feature of the present invention, each related pair of channels 18 may be located as remotely from each other as desired.

In explaining the application of the present invention, but a single matrix character, the lower case E, will be illustrated and described hereinafter, it being understood that the accommodation for other characters or for pluralities of characters may be obtained by enlargement or extension of the principles to be hereinafter described.

Referring now to Figs. 1, 2, and 3, it will be noted that the operating mechanism of the control unit is driven by means of a pulley belt 19 from the intermediate drive shaft of the principal machine. Power transmitted through belt 19 is communicated to a pulley 21 and from there through a pair of gears 22 to a driven shaft 23. As will be noted by reference to the parent disclosure, the essential functions of the driven shaft 23 reside in its manipulation of the record reader mechanism 24. Through another gear pair 25 there is driven an auxiliary operating shaft 26, the essential function of which resides in its manipulation of the assembling elevator. It is in association with this latter shaft that the present invention will be illustrated in accordance with a preferred embodiment.

Shaft 26, through worm 27 drives a stud shaft 28 (Figs. 2, 5, and 6) by its engagement with a worm wheel 29. Mounted on shaft 28 is a clutch 31 having a driven portion 33 which is normally withheld from engagement with its driving portion 32 through the cooperation between a lug 34 integrally formed with it (Fig. 4) which encounters alternately each of a pair of disengagement levers 35 and 36. Each lever 35 and 36 is provided with a horizontally extending section that is placed tangentially with respect to the driven member 33 and contains an opening (see Fig. 5) one side of which is beveled in a direction such that when the lug 34 is received therein, the latter member together with its integrally formed main portion, the driven section 33 is cammed away from the driving section 32. Through clutch 31 motion is imparted from shaft 28 to a sleeve 37, which carries a cam 38 for operating the elevator raising mechanism and a spur gear 39 best indicated in Figs. 3, 4, and 5. The elevator operating cam 38 functions through a bell crank segment 41, forcing a thrust rod, generally indicated 42, which is comprised of a dash pot 43 and a compression spring 44 to rock bell crank lever 45, pivoted at 46, one arm 47 of which is connected to the elevator push rod 48. The operation of the elevator lifting mechanism and its control is more fully described and explained in the parent patent referred to above.

The spur gear 39 which is also secured to sleeve 37, cooperates with a driven gear 49 that is carried upon a stub shaft 51. The ratio between spur gear 39 and driven gear 49 is 1 to 2 in the instant adaptation, though, as may be discerned from the following description, this ratio may vary in accordance with the number of alternative positions to be assumed by a selector bar 52 which in turn will correspond to the number of matrix storage channels to be served in the selection. In the instant case, but two channels are thus served, so that the gear ratio mentioned above is accordingly 1 to 2. Thus while shaft 28 is making one revolution, shaft 51 will make but one-half revolution, or, in terms of elevator operations, for each operation of the elevator manifest by one revolution of shaft 28, shaft 51 will describe a half revolution, assuming either of two alternative positions, one of which is illustrated in Fig. 6. During this condition, a crank 53 carried by the foremost end portion of shaft 51 remains with its driving pin 54 in the upper position. During its alternative condition, which is not illustrated, the pin 54 is in an opposite position 180° therefrom. Pin 54 travelling in a slot 55 formed in one arm 56 of a bell crank member 57 reciprocates the latter during its alternative presentment, causing the other arm 58 of bell crank 57 to assume either of two corresponding positions, one of which is illustrated in Fig. 6. This motion is imparted through the disc and socket connection 59 to the special code or selector bar 52.

Bar 52 lies parallelly with and functions in a generally similar manner to the standard code bar selectors 14. It differs in this respect, however, from the other code bars; where the general class of code bars 14 are variously provided with notches and projections throughout their entire length, which notches and projections cooperate in the selection of any of the selectable bars 13; bar 52 is provided with but a few isolated projections indicated 61 that cooperate in the selection of but those certain selectable bars 13 which function to condition and cause to be operated the release reeds 11 of plural channel contained matrices; in the instant case, the lower case E character matrices. Where a particular character is provided with two channels, bar 52 will accordingly be provided with two projections 61 serving in this selection, and where another character is likewise provided with two channels, bar 52 will be provided with two additional projections 61 serving its alternative selectable bars 13 in a similar manner. Since for each selection of the several bars 14 but one class of character selectable bars 13 may be selected, bar 52 functions in a secondary capacity to determine which of two associated character bars 13 will be the one to respond in accordance with the particular selection.

During its normal condition, shaft 28 is disposed in the position illustrated in Figs. 3 and 6 with its projection 34 residing in the opening of lever 35. Upon the selection of the elevator selector bar 62, Fig. 3, a link 63 is pulled upwardly, and through its connection at 64 with lever 35, causes the latter likewise to be pulled upwardly or rotated about pivot 65. This performance may also be obtained manually by depressing the projecting portion 66 which protrudes from the framework, generally indicated 67 in Fig. 6. In this manner the driven portion 33 is released and is permitted to engage the constantly rotating driving portion 32. Following this, the driven

portion 33 describes a half revolution whence projection 34 comes into engagement with the bevelled opening of lever 36 where, as in the case of lever 35 and in a similar manner, it is again withdrawn, separating the elements of clutch 31 and momentarily arresting shaft 28. Coincident with this performance, the elevator is raised by cam 38 to its upper level where the assembled matrices may be removed by the delivery slide for transmission in a manner well known in the art.

As a result of the movement of the line delivery slide, an arm 68 associated with it is permitted to reciprocate through a limited arc from its normal position, illustrated in Fig. 1, first in a counterclockwise direction, then back again in a clockwise direction. Arm 68 and its performance being characteristically well known in the art of commercial types of linecasting machines, it will be understood that the movement thereof permits a corresponding movement in a clutch release bail 69, pivoted at 71, which bail through link 72, also illustrated in Figs. 2, 3, and 6, controls the release of clutch 31 in its second half revolution.

The clutch release bail 69 is spring-urged in a counter-clockwise direction and is maintained in its clockwise extremity by the tangency of the delivery slide arm 68, see Fig. 1. In its first movement in a counterclockwise direction, bail 69 thrusts rod 72 rightwardly, as viewed in Figs. 2, 3, and 6, causing an intermediate lever 77 to be rocked in a counterclockwise direction about its pivot stud 78 and thrusting a connecting rod 79 leftwardly. This trips bell crank lever 36 through the engagement of a pawl 73 carried by rod 79 and thereby releases the driven portion 33 of clutch 31, allowing the latter to complete the second half of its revolution. The purpose of conditioning the consummation of the cycle of shaft 28 upon the proper operation of the elevator is to prevent the return of the matrix assembling block to its composing level in case of an uncompleted delivery, in which event the load of matrices would still remain in the assembling block. Upon the return of the delivery slide arm 68, bail lever 69 is rotated clockwise, imparting a leftward motion to connecting rod 72, a counterclockwise motion to lever 77, and a rightward motion to connecting rod 79. This permits pawl 73 to again engage the depending projection 74 of bell crank lever 36 in contemplation of a succeeding operation. The tripping of lever 36 as in the case of lever 34 may also be manually executed by depressing the projecting portion 76 which protrudes from the framework 67. It should be noted that the second half revolution of shaft 28 being responsive to the release of the delivery slide arm 68 is conditioned thereby upon the successful operation of the elevator without which the delivery slide arm 68 may otherwise not be permitted to enter upon its cycle of operation, so that pawl 73 thereby is conditioned also through its engagement with projection 74 of lever 36.

Upon a successful operation of the elevator, the shaft 28 describes a complete revolution of 360°, imparting a half revolution of 180° to shaft 51 and causing the latter, through its articulation with special bar 52, to be moved from one of its positions to the other, depending upon the preceding or last operated condition thereof. Thus, in accordance with the particular embodiment, bar 52 functions to condition for selection

one of two alternatively selectable code bars 13 during the composition of one line and to condition the other bar 13 during the composition of a consecutive line. The projections 61 which are provided with bar 52 correspond one with each of the selectable elements or bars 13 to be served. Accordingly there are as many pairs of projections 61 as there are pairs of bars 13, and the several pairs 61 are so arranged that upon one placement of the bar 52, certain ones of each pair of projections 61 are presented so as to block the selection of their associated elements 13 while the other ones of the pairs of projections 61 present a clearance and permit the selection of their associated elements 13, but upon the alternative placement of the bar 52, the corresponding blocking and clearance conditions are reversed. In this way bar 52 by its relative placement is able to condition for selective operation each element 13 of a pair or ones of several pairs, the ultimate selection of the elements depending of course upon the placement of the standard selector bars 14 in accordance with code signals.

It should be understood that if the frequency of alternative channel selection is inadequate, in accordance with an arrangement for shifting during successive lines of composition, the present invention may be associated with an operating organ of the control unit other than shaft 28, the cycle of operation of which is more frequent in occurrence, or, if preferred, a special operating shaft deriving its power from any suitable source may be supplied for actuating the elements which in the instant case have been associated with the elevator operating shaft 28.

While the present invention has been explained and described with reference to a specific embodiment thereof, it should be understood that numerous changes and modifications may be made without departing from the spirit or scope thereof. It is therefore intended not to be limited to any of the details of the foregoing description nor to the specific illustrations of the accompanying drawings, but to be permitted, instead, a latitude of interpretation as indicated by the hereinafter appended claims.

What is claimed is:

1. A linecasting machine including a composing mechanism having a magazine affording a plurality of channels each adapted to contain a number of matrices having different character taglios individual thereto, each character class appurtenant to an individual one of said channels with certain character classes appurtenant to two channels located indiscriminately in said magazine, an automatic control mechanism including means for individually releasing matrices from their channels, and means operative for releasing the same character matrices from alternate channels during successive cycles of operation.

2. In a linecasting machine, a magazine affording a plurality of channels for supporting a plurality of matrices bearing different characters, certain of said characters to be received in certain ones of several of said channels, and means including pluralities of selectable elements responsive to a common automatic stimulus for releasing matrices from said several channels during successive cycles of operation of said machine.

3. In a selecting mechanism, a plurality of selectable elements, coded members presentable into alternative selecting positions for conditioning said elements, and means for moving one

of said coded members into each of its positions comprising a shaft, and an all-mechanical element for connecting said shaft and said one coded member.

4. In a selecting mechanism, a plurality of elements to be selectively conditioned for performing various functional operations, means for selectively conditioning said elements identified with certain functions including a code bar having notches and projections arranged in accordance with a predetermined coded relation, and periodically controlled means for moving said code bar to vary the placement of its notches and projections comprising a crank and a linkage associating said code bar and said crank.

5. In a linecasting machine, a storage magazine having a plurality of matrix supporting channels for supporting character bearing matrices, certain character matrices being supported in several of said channels, a matrix release mechanism associated with each of said several channels, a coded element for conditioning said matrix release mechanisms selectively, power means for moving said coded element, and control apparatus for initiating the performance of said power means including a storage signal controlled device and manually controllable means.

6. In a line composing machine, a pair of automatically selectable matrix release elements which tend to be selected concurrently, a device for alternatively conditioning one and disabling the other of said elements, and an automatically operating organ for periodically actuating said conditioning device.

7. In a linecasting and composing machine, an automatic control mechanism having continuous alternative conditions of functional capacity, a device for enabling said mechanism to assume each of its conditions successively, a periodically operative organ, and means for actuating said device under the stimulus of said periodically operative organ.

8. In a selector mechanism, a plurality of selectable elements, a series of coded members for alternatively blocking ones and enabling others of said elements, a periodically operative organ, and means for positioning one of said members under the stimulus of said organ including a pair of communicating members having a predetermined cooperative relation corresponding to the number of alternative positions of said elements.

9. In a linecasting and composing machine, a composing mechanism for assembling matrices for line composition, an automatic control unit responsive to signals for initiating the performance of said composing mechanism, and a shifting apparatus responsive to composing operations of said mechanism during successive lines of composition by assuming alternative shift conditions affecting said unit.

10. In a selector mechanism, a plurality of elements to be individually conditioned for selective operation, a set of coded members each shiftable into alternative positions for respectively blocking or clearing each of said elements, and an additional coded member active conjointly with said set of coded members but selectively operative upon certain ones only of said plurality of elements for changing the selective condition.

11. In a linecasting machine, an automatic control unit including a set of signal responsive selectable elements, a magazine affording a plurality of channels with several of said channels allotted to the same class of character matrix, an assembler in which said matrices are assem-

bled, means responsive to certain allotted signal conditions for controlling the release of matrices from said channels and their assembly in said assembler, and means included within said unit operated periodically in accordance with the movement of said assembler for rendering another of said several channels containing the same character matrix subsequently effective upon the receipt of said allotted signal conditions.

12. In a linecasting machine, a magazine affording a plurality of channels with several of said channels located indiscriminately in said magazine allotted to the same character matrix, means including a plurality of selecting members responsive to signal conditions, a plurality of selectable members operatively related to said selecting members for controlling the release of matrices from said channels, and means operated automatically for varying the selective relation between said selecting and said selectable elements whereby a predetermined signal condition may be effective to control the release of the same character matrix from different channels of the magazine.

13. In a linecasting and composing machine, a pair of matrix release reeds, a pair of selectable elements for actuating said reeds, each arranged to correspond to the elements of a certain selecting code, a device for alternatively conditioning one and for disabling the other of said pair of selectable elements to respond to said code, and a periodically operative organ for actuating said conditioning device in accordance with successive operations.

14. In a mechanical selector mechanism, a plurality of selectable bars each having a distribution of notches and lugs, a set of selecting bars having notches and lugs presented in perpendicular relation to the notches and lugs of said selectable bars and adapted by various disposition to provide an individual clearance to each of said selectable bars and to some of said bars in duplicate, means for shifting said selecting bars in accordance with the elements of a code system, an additional selecting bar having lug projections to be associated with certain of said selectable bars, and means independent of signal conditions but actuated by a predetermined local condition for shifting said additional selecting bar to selectively prepare some and disable others of said duplicate coded selectable bars.

15. In a mechanical selecting mechanism, a plurality of selectable elements, a set of selector bars, means controlled by the elements of a code system for setting said selector bars, an additional selector bar, and means for setting said additional selector bar collaterally to a predetermined selected condition for controlling the operation of a selectable element.

16. In combination, a mechanical selecting device, a plurality of selectable elements, a set of selector bars, means for setting certain of said selector bars variously in accordance with the elements of a code, and means for setting one of said selector bars under the control of successive cyclic operation of said device to control the selection of a selectable element.

17. In combination, a mechanical selector mechanism, a plurality of selectable elements, a set of selector bars, means for moving certain of said selector bars under the control of consecutive cycles of operation of said mechanism for selectively preparing one of said selectable elements, and signal control means for moving

others of said selector bars for consummating the selection of said selectable elements.

18. In a selecting device, a plurality of coded selecting elements, a plurality of members to be selected thereby, certain ones of said members tending to be selected concurrently, a cyclically operated power driven mechanism for performing incidental functional operations, and means for conditioning ones of said members which tend to be selected concurrently for successive selection in accordance with successive operations of said mechanism.

19. In a linecasting machine, a magazine affording a plurality of channels for supporting a plurality of matrices bearing different characters, certain of said characters to be received in certain ones of several of said channels, means for releasing said matrices including a plurality of selectable elements, means responsive to coded signal conditions for selecting said elements, a common actuator, means moved into the path of said actuator and actuated thereby in response to the operation of said elements, an additional selecting means, and means for operating said last mentioned means collaterally to a predetermined selected condition for controlling the operation of a selectable element and the means moved into the path of said actuator.

20. In a mechanical selector mechanism, a plurality of selectable bars, a set of selecting bars having notches and lugs presented to said selectable bars and adapted by various disposition to provide clearances to said selectable bars individually and to some of said bars dually, means for shifting said selecting bars in accordance with the elements of a code system, an additional selecting bar having lug projections to be associated with certain of said selectable bars, and means for shifting said additional selecting bar to prepare selectively one and disable another of said dually selectable bars alternately.

21. In a linecasting and composing machine having a plurality of composition elements to be released selectively, a record reader mechanism, a plurality of selectable elements assigned to control the release of the composition elements, selector members controlled by said record reader mechanism and variously positionable to select said selectable elements individually and some of them dually, and means for blocking said dually selectable elements alternately.

22. In a linecasting and composing machine, a mechanism for automatically controlling the operation thereof including signal sensing means, means controlled by said signal sensing means for selecting composing operations individually and certain of said operations dually, and shiftable means for obstructing said dually selected operations alternately.

23. In a line casting and composing machine having composing elements stored in groups, means for releasing elements individually from each group, a selectable member arranged to control the operation of each releasing means, a set of notched code bars variously positionable to present an alignment of notches to certain of said selectable members individually and to certain of said members dually, a signal responsive mechanism for controlling the positionment of said code bars, and a blocking bar also controlled by said signal responsive mechanism for alternately blocking said selectable members to which alignments of notches are dually presented.

24. In a linecasting and composing machine, having composing elements stored in groups,

means for releasing elements individually from each group, a selectable member arranged to control the operation of each releasing means, a set of notched code bars permutably positionable to present an alignment of notches to each selectable element individually and to certain of said elements plurally, a signal responsive mechanism

for controlling the positionment of said code bars, a blocking bar positionable to block certain of said plurally selectable members, and a selectable member independent of said releasing means for controlling the positioning of said blocking bar. 5

LOUIS M. POTTS.