W. H. SCHARF.

LINOTYPE MACHINE.

APPLICATION FILED SEPT. 13, 1905.

945,051.

Patented Jan. 4, 1910.

4 SHEETS—SHEET 1.

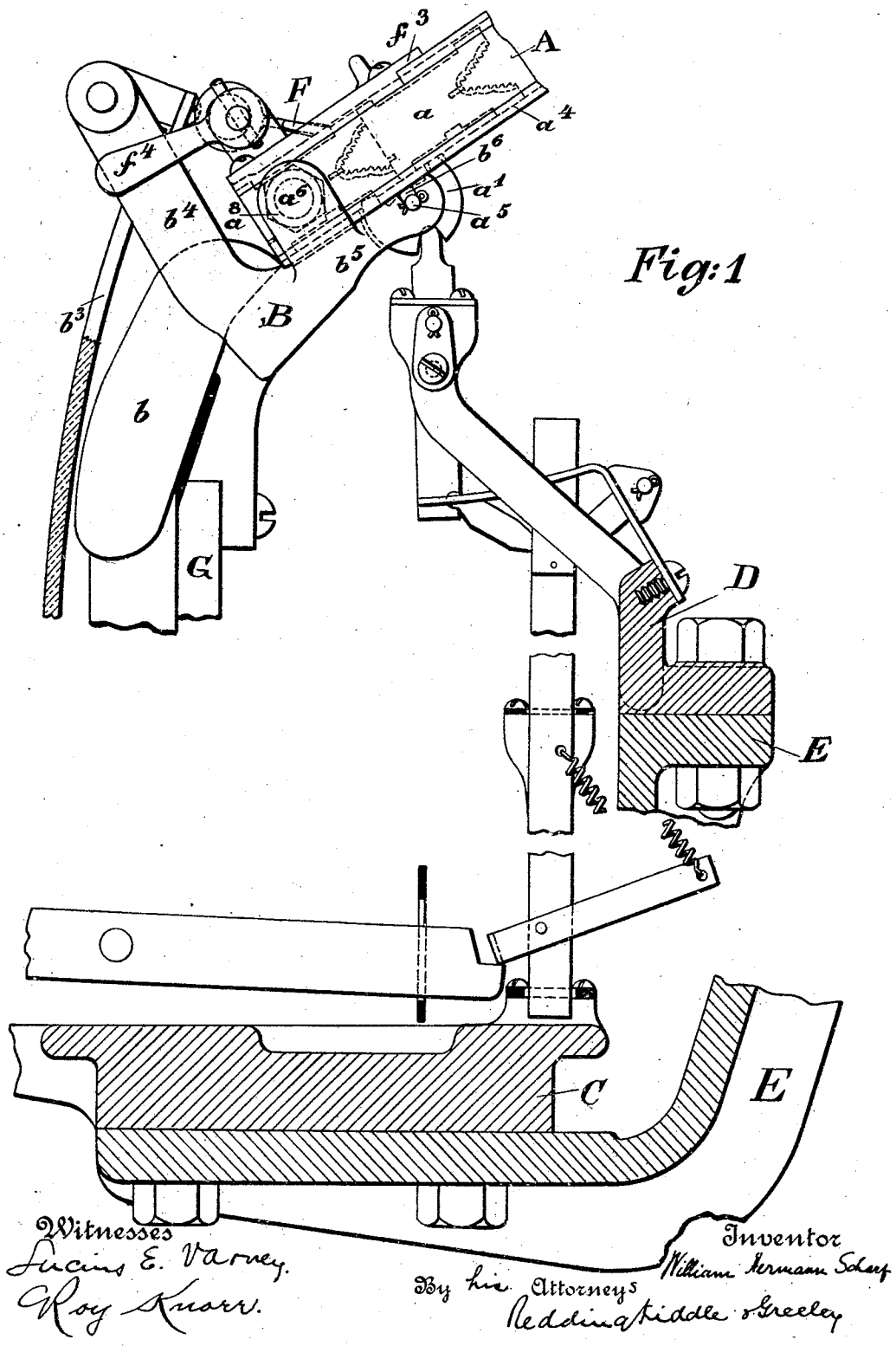

Fig: 1

Witnesses
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Roy Knarr.

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William Hermann Scharf
By his Attorneys
Redding Riddle & Greeley

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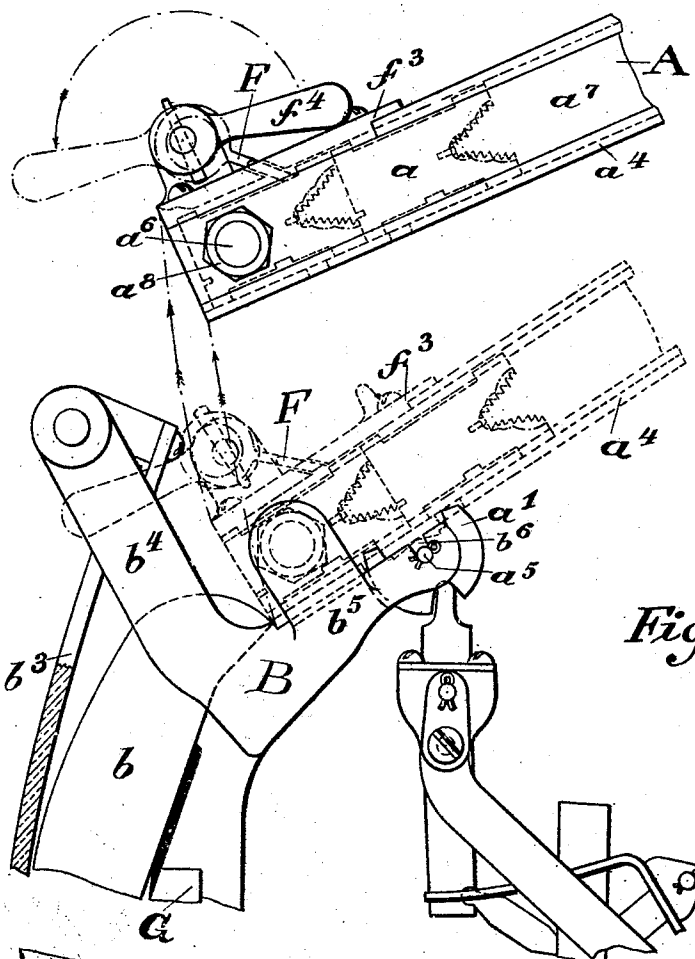

Fig. 2.

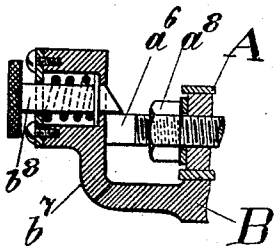

Fig. 10.

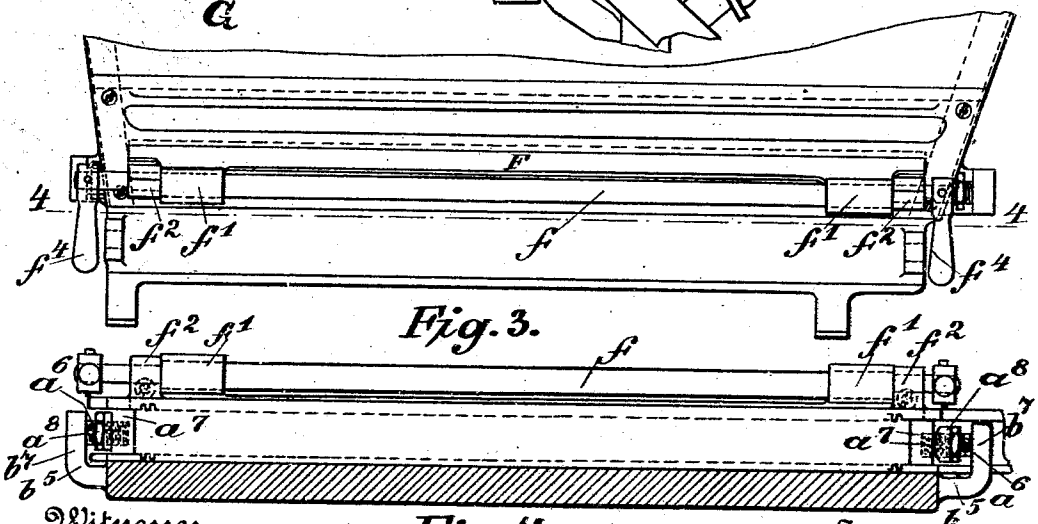

Fig. 3.

Fig. 4.

Witnesses

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4 SHEETS—SHEET 3.

Fig: 5

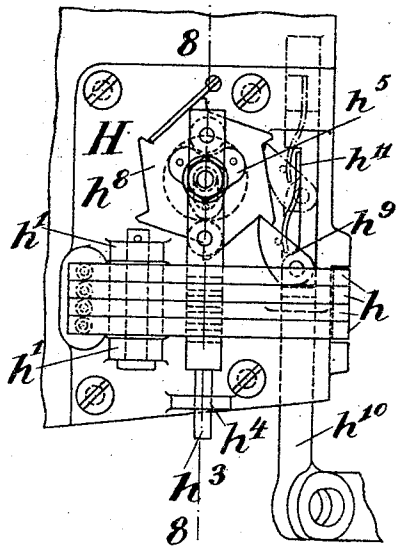


Fig: 7

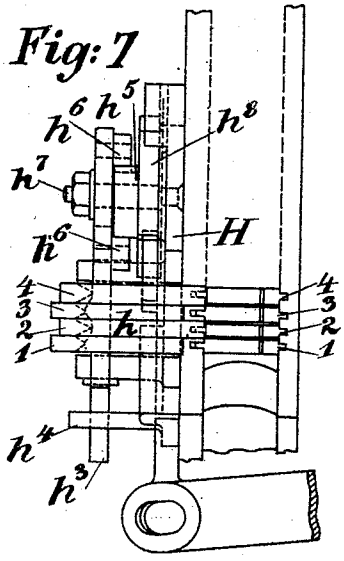
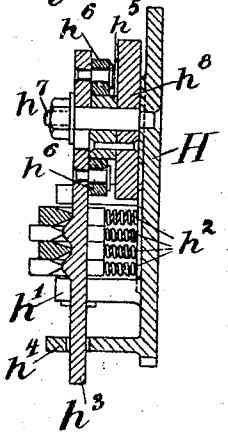


Fig: 8



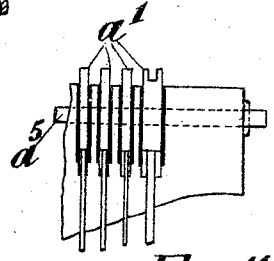


Fig: 11.

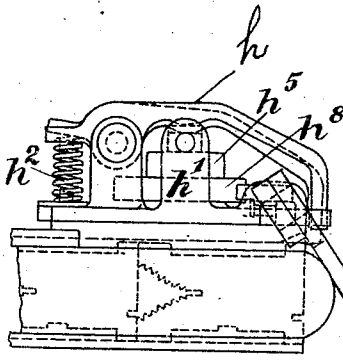


Fig: 6

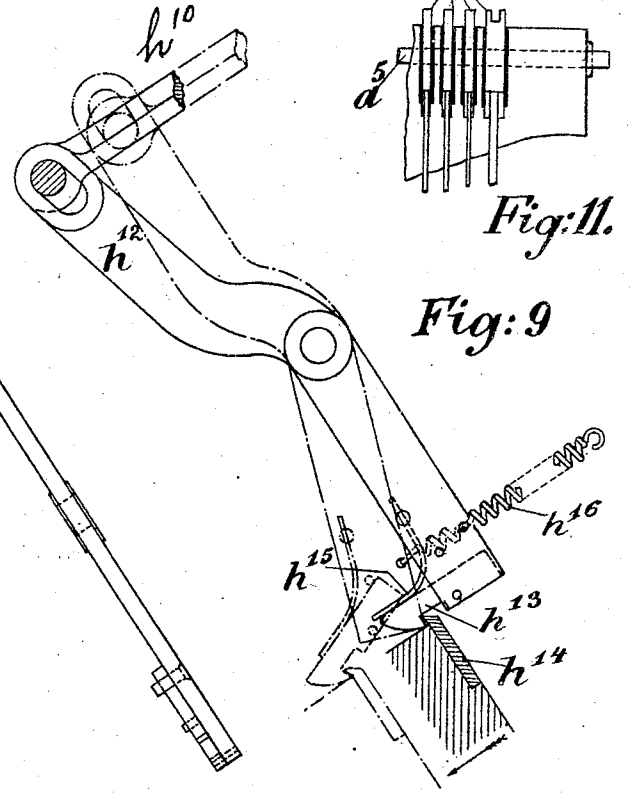


Fig: 9

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4 SHEETS—SHEET 4.

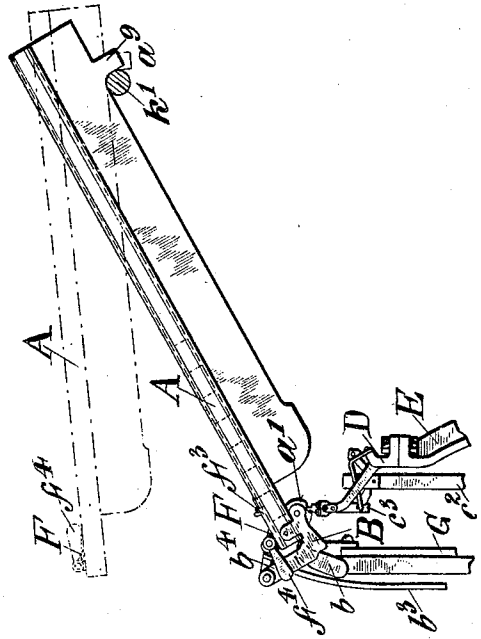


Fig. 13.

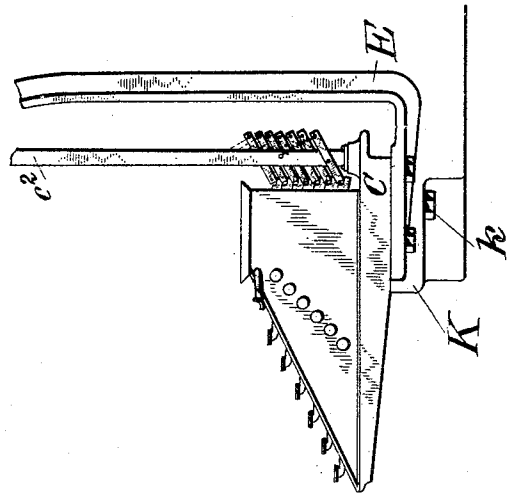
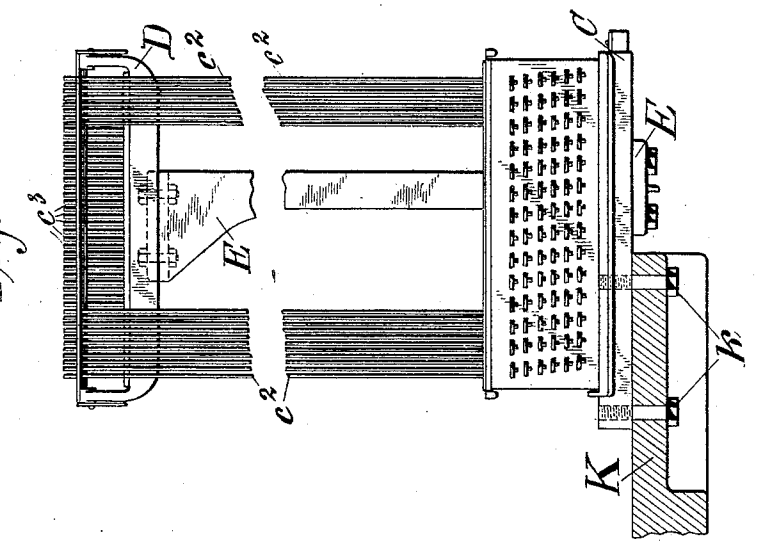


Fig. 12.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM HERMANN SCHARF, OF MONTREAL, QUEBEC, CANADA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO MERGENTHALER LINOTYPE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

LINOTYPE-MACHINE.

945,051. Specification of Letters Patent. **Patented Jan. 4, 1910.**

Application filed September 13, 1905. Serial No. 278,240.

To all whom it may concern:

Be it known that I, WILLIAM HERMANN SCHARF, subject of the King of Great Britain, residing in Montreal, Province of Quebec, Dominion of Canada, have invented certain new and useful Improvements in Linotype-Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates particularly to the composing mechanism of linotype machines.

One of the objects of the invention is to improve and simplify the construction of the magazine and magazine delivery mouth, the latter being that part of the machine into which the matrices are delivered immediately from the magazine; and also to improve and simplify the connection or relation between the magazine and magazine delivery mouth and the adjacent parts, whereby the magazine or different magazines may be readily attached to and detached from the machine and whereby the alinement of the channels in the magazine with the escapement pawls on the one hand and with the channels in the magazine mouth on the other may be entirely automatic.

Another object of the invention consists in reducing the number of parts required and particularly in obviating the necessity of providing a set of escapement pawls upon every magazine.

Another object of the invention is the provision of a device for preventing the matrices from escaping from the delivery end of the magazine when the magazine is removed from the machine and for retracting the ends of the matrices so as to prevent any injury to them while the magazine is being removed and replaced or at any other time.

Still another object of the invention is the provision of an improved matrix control whereby the discharge of the matrices from any number of the channels in the magazine may be regulated, that is, may be permitted only during the composition of alternate lines or during some other predetermined interval.

In accordance with the present improvements the magazine delivery mouth, which has heretofore been made to swing away to permit the magazine to be removed, is rigidly secured in position, and the escapement pawls, which generally have been secured upon the magazine itself, are pivoted upon a fixed part such as the casting which forms the magazine delivery mouth. Furthermore, the different magazines which are to be used upon the machine and which, in view of the present improvements are not required to be furnished with separate sets of escapement pawls, are provided with set screws which may be adjusted to engage projections upon the magazine delivery mouth so that the alinement of the magazine with the adjacent parts will take care of itself, when once the screws have been set in the proper position.

The improvements will be more fully described hereinafter with reference to the accompanying drawings in which a convenient and practical embodiment of the improvement is illustrated, and in which,

Figure 1 is a vertical section taken through the composing mechanism portion of a linotype machine, showing the matrices, matrix releasing mechanism, and magazine in side elevation; Fig. 2 is a similar view showing the upper part of the mechanism shown in Fig. 1, but with the magazine swung up from its original or normal position and the matrices locked therein; Fig. 3 is a plan view of the forward portion of the magazine and its adjacent parts, showing particularly the matrix locking device; Fig. 4 is a view in vertical section on a plane indicated by the line 4—4 in Fig. 3; Fig. 5 is a plan view of the forward lower end of the magazine without the matrix locking device, but showing an improved matrix controlling device; Figs. 6 and 7 are respectively a side view and a front view of the same; Fig. 8 is a view of the same in vertical section on a plane indicated by the line 8—8 of Fig. 5; Fig. 9 is a detail view in elevation of a lever which may be employed to actuate the matrix controlling device from the assembler; Fig. 10 is a detail view in section of one end of the forward portion of the magazine and magazine delivery mouth showing a modification; Fig. 11 is a detail view in elevation of a few of the escapement pawls, showing a double escapement pawl for use

in connection with the matrix release control mechanism; Fig. 12 is a view in front elevation of the key-board and key-rod system partly broken away to show the rear bracket, the portion of the machine to which it is connected being shown in section, and, Fig. 13 is a view of the same in side elevation, with a portion of the front of the machine shown in section, a magazine being shown in position and indicated as swung up from position.

Referring to Figs. 1, 2, 12 and 13, the key-board C and casting D which support the key-rod system, as shown, are connected by a frame piece casting E thus forming a complete and compact portion which is separable from the rest of the machine as one member. This member is secured to the machine by means of suitable fastenings such as two screws k, a portion of the machine being indicated at K.

The casting B upon the front side of the machine, which forms the magazine delivery mouth, is securely fastened in position, as to a fixed part G, and is therefore stationary and rigid; and said casting is preferably formed with brackets or supports b^4 for sustaining the transparent front b^3. Said casting is provided with guide plates b to form guide channels for the matrices a which are delivered thereinto from the magazine A as they are released by the key-rod system. Furthermore, the casting B is provided with an extension b^5 upon which the forward lower end of the magazine rests, which extension is made to support the escapement pawls a'. These pawls, which work through slots in the bottom plate or underside a^4 of the magazine, are preferably one piece pawls, as shown, and are pivoted upon a rod a^5 which rests in recesses, one of which is shown at b^6, in the casting B. These pawls are entirely free of the magazine and the latter may be removed and separated from the machine without disturbing the pawls and without having to unfasten the pawls from the key-rod system each time the magazine is removed. In this way too, only one set of escapement pawls is required, and it is not necessary, as heretofore, to provide a separate set of pawls for each magazine. It will be seen therefore that the number of parts is thus considerably reduced and the expense in construction and assembling of the parts is correspondingly curtailed.

In order to aline the channels in the magazine with the channels in the delivery mouth on the one hand and with the escapement pawls on the other, the magazine is provided with set screws a^6 one on each side of the forward end of the magazine, which screws may be threaded into the side bars a^7 of the magazine. Coöperating with these screws are projections or lugs b^7 formed preferably in the casting B, one at each side thereof, and against these lugs the screws a^6 rest when the magazine is in position upon the machine. The screws when once adjusted so as to bring the magazine into proper alinement with the adjacent parts are locked by means of suitable lock nuts a^8, and it will be clear that when once the adjustment of the magazine has been effected in the manner just described so that the channels therein aline properly with the channels in the magazine delivery mouth and with the escapement pawls, no further adjusting need be done and the magazine may be quickly placed in position, and the alining will take care of itself or in other words will be automatic.

The magazine itself, as shown in Fig. 13, may be provided with a projection or flange or the like indicated at a^9 so that in placing the magazine in position all that is necessary to be done is to bring the magazine down upon the machine with the projection or flange k resting upon a fixed part such as a bar k^1, (indicated in Fig. 13). As the projection or flange a^9 is preferably provided near the upper end of the magazine, the latter may, when it has been placed upon the bar k^1, be swung around upon the same so that its forward end is brought down adjacent to the magazine delivery mouth.

When the magazine has been thus placed in position, it may be secured in position by a spring catch b^8, and one of these may be provided, if desired, upon each side of the magazine delivery mouth, the lugs b^7 being extended for this purpose as shown in Fig. 10. The catch is beveled to permit the free passage of the magazine downward upon the magazine delivery mouth and is made square to prevent it from turning.

It is obvious that many other forms of fastening device might be provided and in some cases the fastening device might be entirely omitted.

To prevent the matrices from falling out of the delivery end of the magazine when the latter is to be attached to or removed from the machine or at any other time and to hold the forward row of matrices well back into the magazine, a matrix locking and retracting device is provided. This device may comprise a long narrow plate F (Figs. 1, 2, 3 and 4), adapted to extend through a similarly shaped slot in the upper plate of the magazine to engage the shoulders upon the forward row of matrices in the magazine, and means to slide the plate forward and backward in the slot to effect the engagement and disengagement of the same with the matrices.

The sliding of the plate backward and forward may be effected by pivotally mounting the same upon a rod f which in turn is mounted eccentrically upon the magazine.

For this purpose the rod f may be passed through projections f' upon the plate and the eccentric ends of the rod may be journaled in bearings f^2 which may be secured to or formed integral with a removable casting f^3 provided upon the top of the magazine for the purpose of affording access to the mouth of the magazine. A handle f^4 may also be provided upon the rod f in order to form a convenient means for rotating the same. In this way, when the handle is in the position shown in Fig. 1, the locking plate will not be in engagement with the matrices and the latter will be permitted to escape from the magazine in the order in which they are released by the escapement pawls; but when the handle is given an upward turn, as shown in full lines in Fig. 2, the plate will be brought against the shoulders of the front row of matrices and will retract them slightly so that their forward ends will not project from the end of the magazine and will lock the matrices in the magazine, as will be clear from the drawings.

From the manner in which the magazine is connected to the magazine delivery mouth and from the construction and mounting of the delivery mouth, it will be clear that the magazine may be removed without interfering with any of the adjacent parts and that when it is in position, it will rest down upon the casting B which is fast upon the machine and therefore holds the parts attached to it firm and steady.

It is often desirable to have in the magazine more than one channel of matrices bearing the same character so that there may be less liability that the supply of matrices bearing any one character will become exhausted during the operation of the machine. Where the magazine is thus equipped the matrices for which more than one channel is provided in the magazine, are drawn first from one channel during the predetermined time and then from another channel during the same predetermined time, this predetermined time generally being the interval between the composition of successive lines of matrices, and so on. The present improvements include a matrix controlling device through which the matrix in any channel may be checked or prevented from being discharged during the predetermined interval notwithstanding the operation of the escapement pawls for that channel.

As represented in the drawing (Figs. 5 and 9), there are four channels to which the improved controlling device is applied, the adjacent channels 1 and 2, in the present case being supposed to contain matrices of one particular character while the adjacent channels 3 and 4 are supposed to contain matrices of another character. The control is constructed so as to be operated by the assembler each time it is moved forward and thereby to lock the matrices in channels 1 and 3 during the composition of one line and then to open the channels 1 and 3 and close the channels 2 and 4 during the operation of the next line, and so on. It will be obvious, however, that the improved control might be applied to any number of channels and to non-adjacent channels, and that the period of locking might be any interval whatsoever.

In accordance with the invention, the matrices are held or locked in their channels by pawls h which are pivoted to a suitable support h' on a base H which may be conveniently fastened upon the top of the magazine toward the forward end thereof. In the form shown, each of the pawls has a forwardly projecting end which is bent over so as to permit it to cover a portion of a matrix channel in the magazine. The other end of each pawl is acted upon by a spring h^2, between said end and the base H, which spring tends to hold the forward end of the pawl down over the corresponding channel in the magazine and said forward end is so bent as to permit it to engage, in its locking position, the forward matrix in the channel. The spring against the rear end of the pawl acting through the forward end of the pawl is sufficient to relieve the tension of the line of matrices upon the corresponding escapement pawl so that the escapement pawl may be freely operated without any danger of jamming any of the parts.

For moving the escapement pawls so as to check the discharge of the matrices in certain of the channels and to permit their free discharge in certain other of the channels, a reciprocating cam rod h^3 is provided and in the present case said rod has high and low cam portions so that, as it reciprocates, these high and low portions are brought alternately under each pawl, whereby the first and third pawls, for instance, will be operated together and then the second and fourth, although any other mode of operation may obviously be arranged for. The rod h^3 has a bearing h^4 at one end thereof and at the other end rests upon a cam h^5 which is provided to reciprocate it and which works between two rollers h^6 upon said rod. The cam h^5 is loosely mounted upon a pin h^7 which extends through a slot in the rod h^3 and said cam is rigidly secured to a ratchet h^8 so as to move therewith. The ratchet h^8 is operated by a pawl h^9 pivoted upon a reciprocating bar h^{10} and normally held so as to engage the ratchet by a spring h^{11}.

The ratchet and cam are so constructed and mounted with respect to each other that upon successive actuations of the ratchet by the pawl the bar will be moved first in one direction and then in the opposite direction

thus operating the first and third pawls h and then the second and fourth pawls h, and so on over again, although, as was stated above, any other manner of operation may be provided.

The bar h^{10} may be loosely connected at one end to the lever h^{12} pivoted to a fixed part of the machine, and the other end of the lever may be adapted to engage the assembly mechanism so that upon the movement of the assembler after a line has been composed, the lever will be operated and will actuate the matrix release control. For this purpose, the lever may be provided with a pawl h^{13} the toe of which is adapted to engage a plate h^{14} upon the assembler. When the assembler is moved toward the left, as indicated in Fig. 9, the lever will follow, as shown in the broken lines, a spring h^{15} keeping the pawl in engagement with the plate h^{14}. Then, as the assembler moves or swings around as described in Letters Patent No. 734,746, dated July 28, 1903, the pawl will be disengaged therefrom and the lever will be pulled back to its first position by a spring h^{16}. When the assembler is swung back the plate h^{14} will ride underneath the toe of the pawl h^{13} and the parts will then come to their original positions.

The escapement pawls a', a few of which are shown in Fig. 11, are actuated by the finger keys to release the matrices, as will be clearly understood, and as is described in an application, filed September 13, 1905 and No. 278,239. Where there are two channels of matrices bearing the same character, the escapement pawls for these matrices are secured together, thus forming a double escapement pawl, the extreme right pawl shown in Fig. 11 being such a double pawl. This pawl therefore operates to release a matrix in both channels at the same time, although only one matrix is delivered from the magazine owing to the matrix release control. Where there are three channels it will be understood that a triple escapement pawl may be provided, and so on.

Various changes may be made in the construction and mode of operation of the several parts described herein without departing from the spirit of the invention and the improvements are not limited therefore to the embodiment thereof herein specifically referred to.

I claim as my invention:

1. In a linotype machine, the combination with a magazine, adjustment screws on the magazine, escapements for the matrices, and a front therefor, of a member forming a magazine delivery mouth and having thereon means to support said front, means against which the magazine adjusting screws may rest, and means to support the escapements.

2. In a linotype machine, the combination of a removable swinging magazine, escapements secured to a fixed part, an adjustable device for guiding the forward end of the magazine into exact position to aline the escapements, a fixed magazine delivery mouth into which the matrices are delivered from the magazine, and a spring catch to secure the magazine down upon the magazine delivery mouth.

3. In a linotype machine, the combination with the keyboard, the magazine, magazine adjusting screws on the magazine, escapement pawls and a front therefor, of a casting adapted to be rigidly secured to the machine and having brackets to support said front, lugs against which the magazine adjusting screws may rest, means to support the escapement pawls, and guide plates to form matrix channels.

4. In a linotype machine, the combination with a magazine having a transverse slot in the upper side thereof, of a plate operating through said slot to engage the shoulders upon the forward line of matrices simultaneously in order to retract the matrices and prevent their discharge.

5. In a linotype machine, the combination with a magazine having a slot in the upper side thereof, of a plate thereon operating through said slot, and eccentric bearings for said plate whereby it may be brought to engage the shoulders upon the matrices to retract them and prevent their discharge.

6. In a linotype machine, the combination with escapements upon a fixed part of the machine, of a magazine having an upper plate, a lower plate and side bars, slots in the lower plate to permit the escapements to engage the matrices, and a slot in the upper plate through which the locking of the matrices may be effected, the side bars of the magazine being adapted to contain means for adjusting the position of the magazine with reference to the escapements.

7. In a linotype machine, the combination of a stationary magazine delivery mouth, escapement pawls pivoted thereon, a key-rod system operatively engaging the pawls, a magazine having slots upon its under side to permit the pawls to engage the matrices therein, and a matrix locking device mounted eccentrically upon the magazine, said magazine also having a slot in its upper side through which said locking device may engage the matrices.

8. In a linotype machine, the combination with the magazine, of a matrix release control in which there are individual releasing members for different channels of the magazine, said control being independent of the escapements for releasing the matrices.

9. In a linotype machine, the combination with a magazine having a plurality of channels for the matrices, of a matrix release control upon and near the lower end of the

magazine, and means to operate said control during the interval of the composing of successive lines.

10. In a linotype machine, the combination with the assembler and magazine, of a matrix release control independent of the escapements, and a lever operatively connected with the assembler to operate said control.

11. In a linotype machine, the combination with a magazine having a plurality of channels for the matrices, and the escapements for the matrices, of a plurality of pawls controlling the discharge of the matrices from some or all of the channels, and means to hold each pawl normally in engagement with the forward matrix in the corresponding channel so that the corresponding line of matrices will be held from movement and the corresponding escapements may be free to operate without becoming jammed.

12. In a linotype machine, the combination with a magazine having a plurality of channels for the matrices, of a plurality of pawls controlling the discharge of the matrices from any or all of the channels, a cam rod for moving the pawls, a cam for moving the cam rod, and a ratchet and pawl for operating the cam.

13. In a linotype machine, the combination with a magazine having a plurality of channels for the matrices, of a plurality of pawls controlling the discharge of the matrices from any or all of the channels, a base upon which said pawls are pivoted, said base being mounted upon and near the forward end of the magazine so that the pawls at one end will overlie the channels, and springs operating against the other ends of the pawls.

14. In a linotype machine, the combination with a magazine having a plurality of channels for the matrices, of a plurality of pawls controlling the discharge of the matrices from any or all of the channels, a base upon which said pawls are mounted, said base being mounted upon and near the forward end of the magazine so that the pawls at one end will overlie the channels, springs operating against the other ends of the pawls, a cam rod for moving the pawls, a cam for moving the cam rod, a ratchet rigidly connected with the cam, a lever adapted to be moved at predetermined times, a bar moved by the lever, and the pawl upon said bar adapted to actuate the ratchet.

15. In a linotype machine, the combination with the magazine, of a matrix release control, and a double escapement pawl for releasing matrices in two different channels of the magazine at the same time.

16. In a linotype machine, the combination with the magazine, key-rod system, and a matrix release control, of escapement pawls, two or more of said pawls being united so as to be operated at the same time by the same key rod.

This specification signed and witnessed this 8th day of September, A. D., 1905.

WILLIAM HERMANN SCHARF.

Signed in the presence of—

FRANK BAYER,

E. J. BRADLEY.