

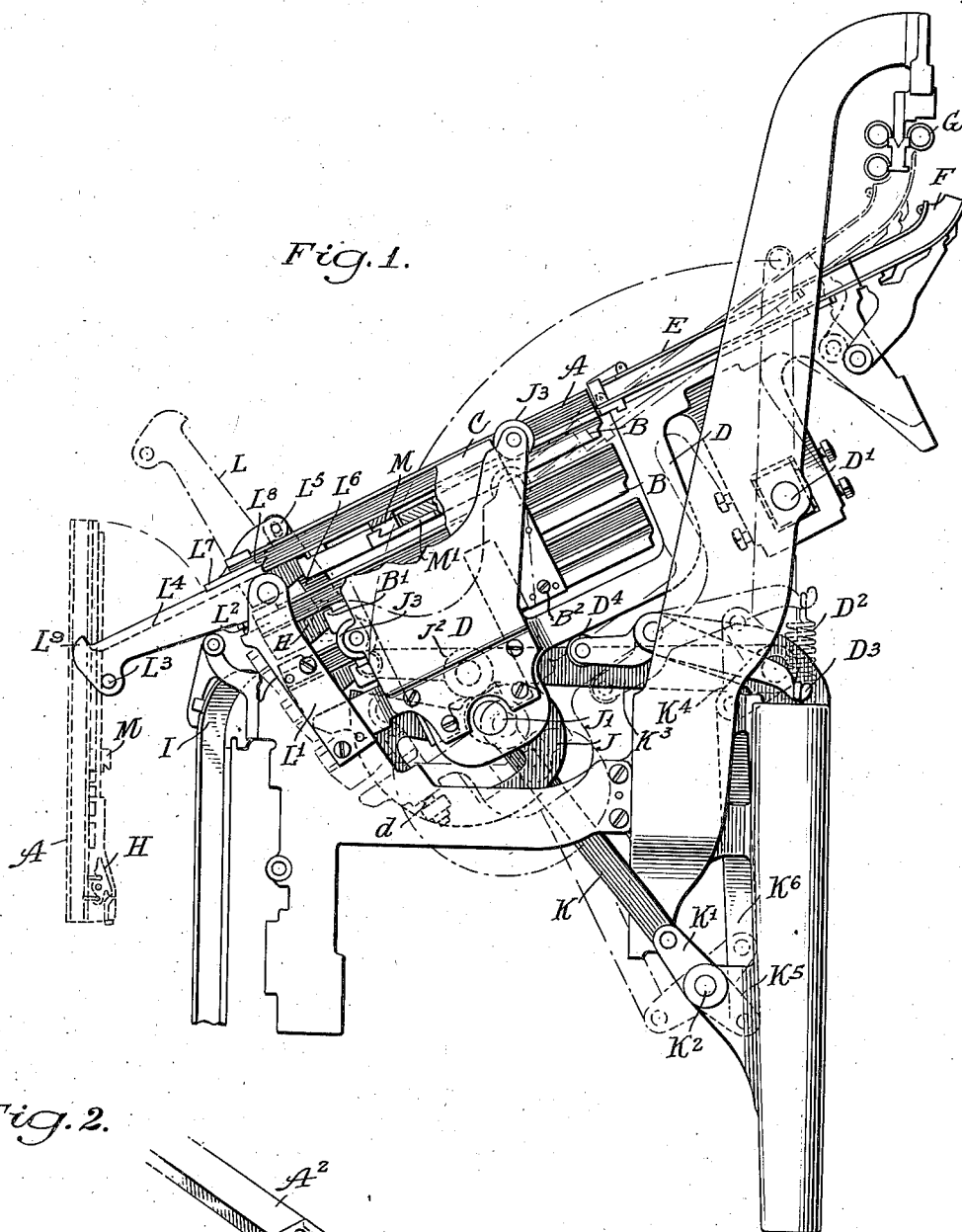
May 4, 1937.

H. A. BURT  
TYPOGRAPHICAL MACHINE

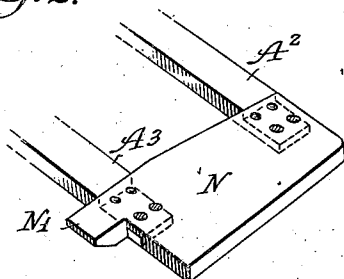
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2 Sheets-Sheet 1



*Fig. 2.*



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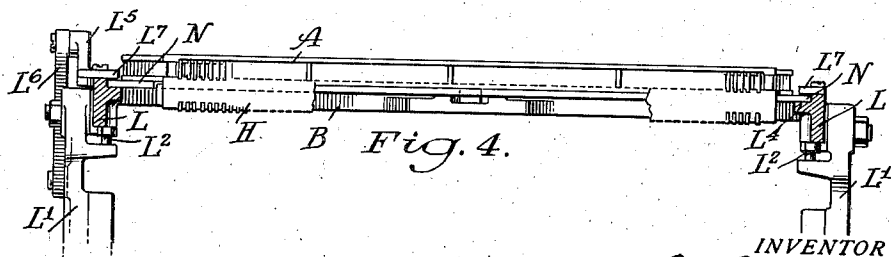
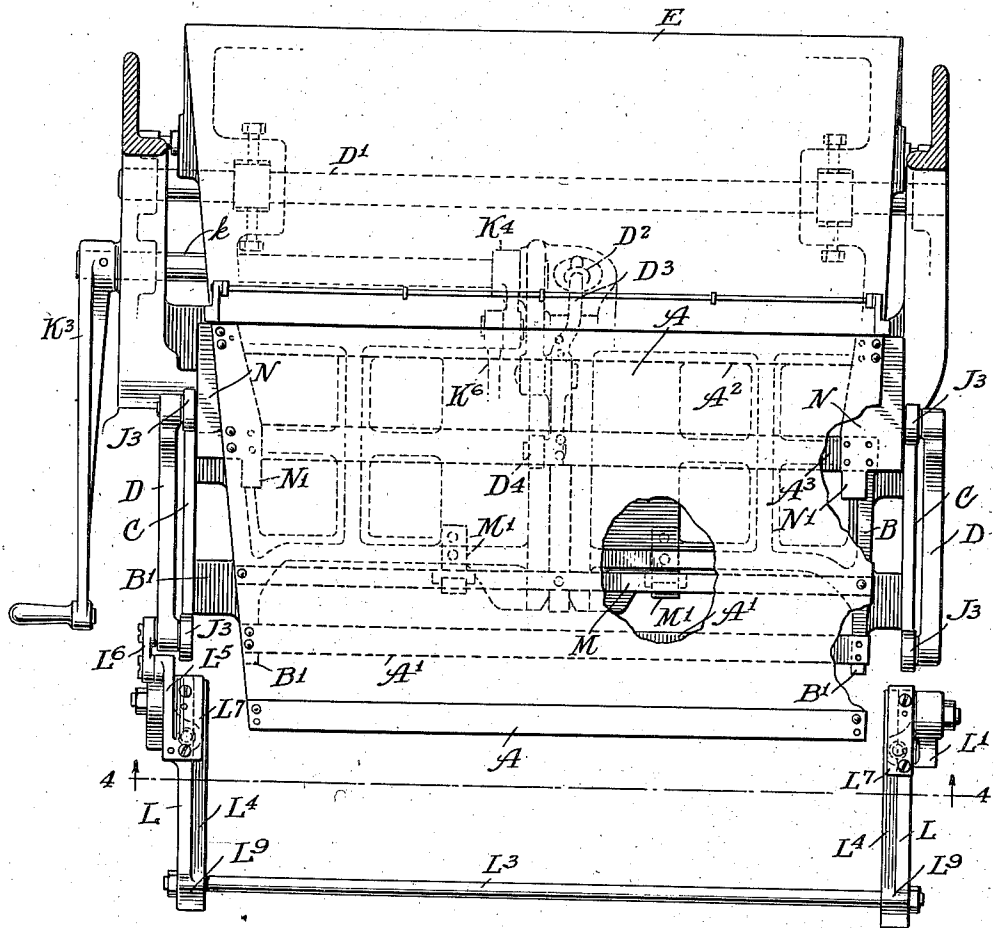
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Fig. 3.



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## UNITED STATES PATENT OFFICE

2,079,199

## TYPOGRAPHICAL MACHINE

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tion of New York

Application December 14, 1935, Serial No. 54,403

24 Claims. (Cl. 199—45)

This invention relates to typographical machines, such as "linotype" machines of the general organization represented in Letters Patent of the United States No. 436,532 to O. Mergenthaler, wherein circulating matrices are released from a magazine in the order in which their characters are to appear in print and then assembled in line, the composed line transferred to the face of the mold, the mold filled with molten metal to form a slug or linotype against the matrices which produce the type characters thereon, and the matrices thereafter elevated and returned through distributing mechanism to the magazine from which they started.

More particularly, the present improvements deal with devices for removing a matrix magazine from its base frame when it is desired to replace such magazine with one containing a different matrix font, and they have especial application to a machine equipped with a plurality of magazines arranged in superposed relation or in bank.

In the present instance, the base frames that support the individual magazines are fixed relatively to each other in or as part of a rigid shift frame, and the latter is movably mounted in a supporting frame which is pivoted in the main frame of the machine and is adapted, when the removal of a magazine is desired, to be swung upwardly to permit a selected magazine to clear the assembler entrance. In removing the magazine, it is slid forwardly on its base frame, substantially in the plane thereof, until arrested by a pair of arms positioned to receive it, and then by a rocking motion, suspended in a vertical position on the arms free and clear of the assembler entrance as well as the other magazines. The magazine may then be readily lifted from the supporting arms and replaced by another magazine which can be positioned on its base frame by a reverse manipulation of the parts.

Not only do the arms, just alluded to, serve as a guide for the magazine during its removal but in addition they actually secure it against tilting out of the plane of its respective base frame until after its lagging or rear edge clears the other magazines in the bank. In the embodiment illustrated, these safety means include a pair of plates mounted on the magazine adjacent the rear edge thereof, and a pair of guideways formed in the supporting arms, which in addition are equipped with a pair of plates overlying the guideways and which cooperate with the plates on the magazine to prevent the

latter from being tilted prematurely as it is moved off its base frame. These same devices also serve, during the replacement of a magazine, to guide the same properly onto its base frame, thus preventing damage to the parts very likely to occur should the operator attempt to push the magazine home without first making sure it is accurately located.

Then, too, the plates on the magazine are formed with inclined surfaces, arranged to cooperate with the magazine holding lugs usually presented at the front of the base frame and guide the magazine over such lugs during its removal.

The improvements herein also provide for automatically positioning the magazine supporting arms as the supporting frame is swung upwardly to locate the selected magazine in the magazine removal position. Moreover, provision is made for locking the magazines on their base frames against inadvertent disengagement such as might result in the magazines sliding out with nothing to receive them, with consequent injury to themselves and other parts of the machine, as well as to the operator.

Referring to the drawings:

Fig. 1 is a side elevation of a portion of a typographical composing machine equipped with the present improvements;

Fig. 2 is a perspective view of one of the plates with which each of the magazines is equipped and which cooperates with the magazine supporting arms during the removal and the replacement of a magazine;

Fig. 3 is a plan view of a portion of the machine shown in Fig. 1, with the magazine supporting arms in position to receive the selected magazine as it is removed from its base frame; and

Fig. 4 is a vertical longitudinal section on line 4—4 of Fig. 3.

The matrices are stored according to font or otherwise in the magazines A, three of which are shown, but of which a greater or lesser number might be employed if desired. The several magazines are removably mounted upon separate base frames B, as by means of lips or shoulders B<sup>1</sup> rising from the forward or lower ends of the base frames and engaging in front of cross ribs or plates A<sup>1</sup> attached to the undersides of the magazines. The three base frames B are all connected by means of screws B<sup>2</sup> to a pair of side plates C, these parts thus constituting a rigid shift frame for the magazines. The shift frame is in turn mounted in a relatively fixed supporting frame D pivoted at its upper

end (see Fig. 1), as at D<sup>1</sup>, to the machine frame and resting loosely at its lower end upon adjusting screws *d* carried by the machine frame.

It may be stated here that the magazines herein shown are of the short variety and, for this reason there is employed in connection with the magazines, a channeled conductor E which serves to connect the active one thereof with the customary magazine entrance F leading from the distributing mechanism G. As will be noted from Fig. 1, both the magazine entrance F and the channeled conductor E are mounted directly on the supporting frame D.

In the embodiment illustrated, the magazines are each provided with a fixed bank of escapements H adapted to be actuated in the usual way from the main keyboard but, as these parts are well known and form no part of the present invention, any further description would be superfluous. If desired, reference may be had to the Kennedy Patent No. 1,561,244 for fuller information with respect to the keyboard connections. An assembler entrance I is arranged to receive the matrices as they are released from the magazines and carry them to the composing or assembling mechanism.

In selecting one or another of the magazines for use, the shift frame C is raised and lowered within the fixed supporting frame D to bring the selected magazine into registration with the assembler entrance I at the front and the channeled conductor E at the back.

The mechanism for raising and lowering the magazine shift frame (see Figs. 1 and 3) consist in part of a pair of cams J (only one of which is shown) arranged at opposite sides of the machine and mounted on a shaft J<sup>1</sup> extending horizontally beneath the magazines and journaled at its opposite ends in the supporting frame D. As the cams J are rotated, they cooperate with a corresponding pair of rollers J<sup>2</sup> carried by the shift frame C to raise or lower the latter into a position wherein the selected magazine will be operative, the shift frame during the adjustment just mentioned being guided by anti-friction rollers J<sup>3</sup> with which the supporting frame D is equipped.

When it is desired to remove or replace a magazine, the entire supporting frame D is rocked about its pivot D<sup>1</sup> (as in Fig. 1) to raise the magazines to a position wherein the one selected for removal will clear the assembler entrance I.

The mechanism for raising the supporting frame D includes a toggle device consisting of a pair of pivotally connected members K and K<sup>1</sup>, the member K being rotatably connected to the cross shaft J<sup>1</sup> and the member K<sup>1</sup> fastened to a pivot stud K<sup>2</sup> journaled in the main frame of the machine, the arrangement being such that, as the toggle members are straightened out, the supporting frame D will be raised to its uppermost position wherein the removal of the magazines can be effected. The toggle members are straightened out through the medium of a crank handle K<sup>3</sup> arranged at the side of the machine and pinned to a rock shaft *k*, two arms K<sup>4</sup> and K<sup>5</sup> and an interconnecting link K<sup>6</sup>, the arm K<sup>4</sup> being fixed to the rock shaft *k*, and the arm K<sup>5</sup> fixed to the pivot stud K<sup>2</sup>, and the intermediate link K<sup>6</sup> being pivotally connected at its opposite ends to said arms. If desired, the pivotally mounted supporting frame D may be counterbalanced by a tension spring D<sup>2</sup> (Fig. 1) anchored at one end to the machine frame or a

bracket carried thereby, and connected at its opposite end to the rear arm of a lever D<sup>3</sup> pivotally mounted adjacent its center, and having a front arm provided with an anti-friction roller D<sup>4</sup> bearing against the frame D at the bottom.

The parts as thus far described and except as hereinafter noted, are of well known construction. For a more detailed description thereof, reference may be had to the Burt Patent No. 1,864,799.

In order to remove a magazine from a machine equipped with the present improvements, the magazine supporting frame D is first raised to position the magazine selected for removal above or clear of the assembler entrance I. The supporting frame D in its raised position is illustrated in Fig. 1, and there it will be observed that the topmost magazine (which, for the setting of the cam J as shown, would in its normal position register with the assembler entrance I) has been elevated to clear the assembler entrance, so that the magazine may readily be removed in a forward direction.

As the supporting frame D is raised, a pair of supporting arms L, pivotally mounted in brackets L<sup>1</sup> secured to the main frame of the machine near the front thereof and beyond the side edges of the magazines, are automatically lowered from the dotted line position shown in Fig. 1 to the position shown in solid lines therein, being arrested in the latter position by the banking of an adjustable screw L<sup>2</sup> with which each of them is equipped on shoulders presented by the brackets L<sup>1</sup>, in the plane of the base frame of the magazine selected for removal, and in which arrested position the arms L are set to receive said magazine as it is slid forwardly off its base frame.

In order that the arms L may swing in unison, and also to provide lateral rigidity, they are connected together at their front ends by a cross rod L<sup>3</sup> located somewhat below a pair of guideways L<sup>4</sup> formed in the arms and alluded to in greater detail hereinafter, in order to give clearance for the escapement devices H with which the magazines are equipped as the latter are slid off their frames. The automatic movement of the supporting arms L into and out of active position is effected under the control of the supporting frame D as it is swung about the pivot D<sup>1</sup> to bring the selected magazine into and out of magazine removal position. The mechanism for this purpose includes an arm L<sup>5</sup> fixed to the left hand magazine supporting arm L and which is curved upwardly and rearwardly and connected at its rear end to a link L<sup>6</sup> which in turn is connected to the supporting frame D at the left side thereof at a point near the front edge of the base frames and at about the level of the lowermost one. The curved arm L<sup>5</sup> is short in order that the necessary angular movement between the different positions of the supporting arms L<sup>4</sup> will be derived from the short angular movement of the supporting frame D. According to the foregoing arrangement, the supporting arms will be simultaneously lowered into a position to receive the selected magazine as the latter is brought into the magazine removal position by the upward pivotal movement of the supporting frame D.

When the parts have been thus positioned, the operator removes the magazine first by pushing it rearwardly for a short distance to release it from its base frame whereon it is held against accidental movement in an upward direction by a lock-

ing device including a cross-bar M secured at the underside of the magazine, and engaging behind a pair of spaced members M<sup>1</sup> secured to the base frame and extending forwardly from the front edge thereof. The cross-bar M and the members M<sup>1</sup> have interlocking tongue and groove portions (see Fig. 1) acting to prevent inadvertent disengagement of a magazine when the one next below is being removed, something that might very readily occur (were the safety locking means not provided) due to the close spacing of the magazines, if sufficient caution were not exercised by the operator and which might result in a magazine sliding off its base frame with consequent injury to itself and other parts of the machine, as well as to the operator.

When the magazine has been pushed rearwardly a distance sufficient to effect the disengagement of the locking devices M and M<sup>1</sup> (clearance between the magazine A and channeled conductor E being provided for the purpose, see Fig. 3), and as determined by the banking of the cross bar M against the front edge of the base frame B, the magazine is lifted to allow the cross rib A<sup>1</sup> to clear the lugs B<sup>1</sup> at the front of the base frame and which, as previously stated, serve to retain the magazine in its normal position. The magazine is now slid forwardly along its base frame, but before it loses the support of the frame, a pair of plates N secured at the rear corners of the magazine slide into guideways L<sup>4</sup> formed in the supporting arms L, so that throughout the entire removal of the magazine, it receives support at one time or another by its base frame, the supporting arms L, or both.

The plates N are secured to the magazine at the bottom and have spliced connections with a pair of reinforcing cross ribs A<sup>2</sup> and A<sup>3</sup>, the former being mounted on the underside of the magazine at the rear edge thereof and the latter somewhat in from the rear edge (see Figs. 2 and 3). The plates N have portions extending beyond the lateral edges of the magazine, since the top surfaces thereof, as well as the bottom surfaces, function in the guiding of the magazine off the base frame, as will later be evident. Furthermore, the plates N in their leading edges are formed with forwardly extending portions N<sup>1</sup> presenting bevelled surfaces at the bottom for co-operation with the magazine retaining lugs B<sup>1</sup> at the front of the base frame and which serve to guide the magazine thereover during its removal.

As the plates N enter the guideways L<sup>4</sup> in the supporting arms, they are held therein by a pair of retaining plates L<sup>7</sup> screwed to the supporting arms and overlying the guideways therein for a portion of their length. The plates L<sup>7</sup> extend rearwardly from the arms L for a short distance and present downwardly facing bevelled surfaces L<sup>8</sup> properly to guide the plates N therebeneath and into the guideways L<sup>4</sup>. These plates L<sup>7</sup> co-operate with the plates N on the magazine to prevent it from being rocked or tilted until after the rear edge thereof has cleared the other magazines in the bank. When this occurs, the rear edges of the plates N pass out from under the retaining plates L<sup>7</sup> on the supporting arms, and immediately thereafter bank at their front edges against upwardly projecting lugs L<sup>9</sup> formed on the front ends of the supporting arms L. The magazine may now be rocked into a vertical position (as shown in dotted lines in Fig. 1), wherein it will be supported by the arms L well to the front of the assembler entrance I and the other parts of the machine. When the magazine hangs in a ver-

tical position (which it will due to the fact that the front edges of the plates N are located rearwardly of the center of gravity of the magazine), its removal is readily facilitated.

In order to replace a magazine on its base frame B, it is first hung on the supporting arms L in a vertical position and then tilted into the plane of the base frame, this position being determined by the plates N on the magazine as they come to rest on the guideways L<sup>4</sup> in the supporting arms L. The operator then pushes the magazine rearwardly until the plates N at their rear edges enter beneath the plates L<sup>7</sup> on the supporting arms, thus insuring proper guiding of the magazine in its return to normal position on the base frame. It will be noted that the level of the guideways L<sup>4</sup> on the supporting arms is such that there will be no interference between the plates N and the magazine retaining lugs B<sup>1</sup> as the magazine is moved rearwardly. With the magazine thus properly located, the operator continues to push it rearwardly until the cross bar M on the magazine engages behind the locking members M<sup>1</sup>, the rear lower edge of the bar M being cut away to present a bevelled surface to permit it readily to ride over said locking members. When the bar M clears the locking members M<sup>1</sup>, the magazine will drop into place on its frame and will then slide forward slightly until the cross rib A<sup>1</sup> banks against the retaining lugs B<sup>1</sup> which determine the normal position of the magazine on its base frame. Incidental to this forward movement, the locking members M and M<sup>1</sup> again interengage so that the magazine is effectively secured against accidental disengagement from its base frame.

Thereafter, the supporting frame D is lowered to bring the magazine into its normal position in register with the assembler entrance I and, incidental to the lowering of the supporting frame, the arms L are automatically rocked up out of the way by the means hereinbefore described. In describing the invention herein, the devices located on the magazine and which function during the removal thereof have been referred to in connection with only one magazine, but it is to be understood that all the magazines are equipped in the same manner.

In the accompanying drawings the invention has been shown merely by way of example and in preferred form, and obviously many variations and modifications may be made therein which will still be comprised within its spirit. It is to be understood, therefore, that the invention is not limited to any specific form or embodiment, except insofar as such limitations are specified in the appended claims.

Having thus described my invention, what I claim is:

1. A typographical composing machine including, in combination, a plurality of superposed matrix magazines, a shift frame including relatively fixed individual base frames underlying the magazines and whereon the magazines are removably mounted, and devices common to all the magazines and movably mounted on the main frame of the machine for supporting a selected magazine during its removal from and replacement on the corresponding base frame.

2. A typographical composing machine including, in combination, a plurality of superposed matrix magazines, a shift frame including relatively fixed individual base frames underlying the magazines and whereon the magazines are removably mounted, and devices including a pair

of arms common to the magazines and pivotally mounted on the main frame of the machine, said arms being movable into a position to support a selected magazine during its removal from and replacement on the corresponding base frame.

3. A combination according to claim 1, characterized by the fact that the magazine supporting devices therein referred to are equipped with means for guiding a magazine in the plane of its base frame during both removal and replacement.

4. A typographical composing machine including, in combination, a plurality of superposed matrix magazines, a shift frame including relatively fixed individual base frames whereon the magazines are removably mounted, devices common to the magazines and mounted on the main frame of the machine for supporting a selected magazine during its removal from and replacement on the corresponding base frame, and means associated with the magazines and adapted to cooperate with said devices for holding the individual magazines during removal against tilting until they have cleared the front edges of the other magazines and for locating the magazines properly in the plane of their respective base frames during replacement.

5. A typographical composing machine including, in combination, a plurality of superposed matrix magazines, a shift frame including relatively fixed individual base frames whereon the magazines are removably mounted, devices common to the magazines and mounted on the main frame of the machine for supporting a selected magazine during its removal from and replacement on the corresponding base frame, and means including plates fastened on the magazines and adapted to cooperate with said devices for holding the individual magazines during removal against tilting until they have cleared the front edges of the other magazines and for locating the magazines properly in the plane of their respective base frames during replacement.

6. A typographical composing machine including, in combination, a plurality of superposed matrix magazines, a shift frame including individual base frames upon which the magazines are removably mounted, means for moving a selected magazine into position wherein it can be removed from its base frame, devices mounted on the main frame of the machine for supporting the magazines during removal, and means acting as the selected magazine is brought into magazine removal position for automatically moving said devices from a normal inactive position into an active position to receive the magazine as it is removed.

7. A typographical composing machine including, in combination, a plurality of superposed matrix magazines, a shift frame including individual base frames upon which the magazines are removably mounted, means for moving a selected magazine into a position wherein it can be removed from its base frame, devices mounted on the main frame of the machine for supporting the magazine during removal and replacement, and means acting as the selected magazine is brought into magazine removal position for automatically moving said devices from a normal inactive position into an active position to receive the magazine as it is removed and for returning said devices to inactive position as the magazine is brought again to normal position.

8. A combination according to claim 6, where-

in the devices for supporting the magazine during removal are moved to active position under the control of the means for moving the selected magazine into magazine removal position.

9. A combination according to claim 7, wherein the devices for supporting the magazine during removal and replacement are moved to active and inactive position under the control of the means for moving the selected magazine into magazine removal position and back again to normal position.

10. A typographical composing machine including, in combination, a plurality of superposed inclined matrix magazines, a shift frame including relatively fixed individual base frames whereon the magazines are removably mounted, means for moving the shift frame to locate one or another of the magazines in operative relation with the assembler devices, additional means for moving the shift frame as a whole to locate a magazine selected for removal clear of the assembler devices, and movable means mounted on the main frame of the machine and positionable to receive the selected magazine as it is removed from its base frame and support such magazine in its removed position.

11. A typographical composing machine including, in combination, a plurality of superposed inclined matrix magazines, a shift frame including relatively fixed individual base frames whereon the magazines are removably mounted, means for moving the shift frame to locate one or another of the magazines in operative relation with the assembler devices, additional means for moving the shift frame as a whole to locate a magazine selected for removal clear of the assembler devices, and means including a pair of arms pivotally mounted on the main frame of the machine and movable from an inactive to an active position wherein to receive the selected magazine as it is removed from its base frame and support such magazine in its removed position.

12. A typographical composing machine including, in combination, a plurality of superposed inclined matrix magazines, a shift frame including relatively fixed individual base frames whereon the magazines are removably mounted, said shift frame being movable to locate one or another of the magazines in operative relation with the assembler devices, means for moving the shift frame as a whole to locate a magazine selected for removal clear of the assembler devices, means mounted on the main frame of the machine and positionable to receive the selected magazine as it is removed from its base frame, and means cooperating with the magazine as it is removed to secure it against tilting until clear of the other magazines.

13. A combination according to claim 12, wherein the means for securing the selected magazine against tilting are arranged on the means for supporting the magazine during its removal.

14. A typographical composing machine including, in combination, a plurality of superposed inclined matrix magazines, a shift frame including relatively fixed individual base frames whereon the magazines are removably mounted, said shift frame being movable to locate one or another of the magazines in operative relation with the assembler devices, a supporting frame in which the shift frame is mounted, said supporting frame being movable to locate a magazine selected for removal clear of the assembler devices, and movable means mounted on the main frame of the

machine and positionable to receive the selected magazine as it is removed from its base frame and support such magazine in its removed position.

15. A typographical composing machine including, in combination, a plurality of superposed inclined matrix magazines, a shift frame including relatively fixed individual base frames whereon the magazines are removably mounted, said shift frame being movable to locate one or another of the magazines in operative relation with the assembler devices, a supporting frame in which the shift frame is mounted, said supporting frame being pivotally mounted in the main frame and movable to locate a magazine selected for removal clear of the assembler devices, and movable means mounted on the main frame of the machine and positionable to receive the selected magazine as it is removed from its base frame and support such magazine in its removed position.

16. A typographical composing machine including, in combination, a plurality of superposed inclined matrix magazines, a shift frame including relatively fixed individual base frames whereon the magazines are removably mounted, said shift frame being movable to locate one or another of the magazines in operative relation with the assembler devices, a supporting frame in which the shift frame is mounted, said supporting frame being pivotally mounted in the main frame of the machine and movable to locate a magazine selected for removal clear of the assembler devices, and means carried by the main frame of the machine and normally inactive but movable under the control of the supporting frame into an active position wherein to receive the selected magazine as it is removed from its base frame and support such magazine in its removed position.

17. A typographical composing machine including, in combination, a plurality of superposed inclined matrix magazines, a shift frame including relatively fixed individual base frames whereon the magazines are removably mounted, said shift frame being movable to locate one or another of the magazines in operative relation with the assembler devices, a supporting frame in which the shift frame is mounted, said supporting frame being pivotally mounted in the main frame of the machine and movable to locate a magazine selected for removal clear of the assembler devices, and means including a pair of arms pivotally mounted on the main frame of the machine and normally inactive but adapted to be moved under the control of the supporting frame into an active position to receive the selected magazine as it is removed from its base frame and support such magazine in its removed position.

18. A typographical composing machine including, in combination, an inclined matrix magazine, a base frame whereon the magazine is slidably supported, and means movably mounted on the main frame of the machine for supporting the magazine during its removal from and replacement on the base frame, said means being

equipped with devices for guiding the magazine in the plane of the base frame during both removal and replacement.

19. A typographical composing machine including, in combination, an inclined matrix magazine, a base frame whereon the magazine is slidably supported, assembler devices, means mounted on the main frame of the machine for supporting the magazine during its removal from and replacement on the base frame, and instrumentalities associated with the magazine and adapted to cooperate with said means for holding the magazine against tilting until it can swing clear of the assembler devices and for locating the magazine properly in the plane of its base frame during replacement.

20. A typographical composing machine including, in combination, an inclined matrix magazine, a base frame whereon the magazine is slidably supported, assembler devices, means mounted on the main frame of the machine for supporting the magazine during its removal from and replacement on the base frame, and plates fastened on the magazine arranged to cooperate with said means for holding the magazine during removal against tilting until it can swing clear of the assembler devices and for locating the magazine properly in the plane of its base frame during replacement.

21. A combination according to claim 20, wherein the means mounted on the main frame of the machine for supporting the magazine during removal and replacement are provided with grooves in which the plates on the magazine are adapted to slide.

22. A typographical composing machine including, in combination, an inclined matrix magazine, a base frame whereon the magazine is slidably supported, devices on the base frame adapted to cooperate with means on the magazine for sustaining the latter in normal position on said frame, means on the magazine acting as the magazine is slid forwardly to raise the magazine clear of said sustaining devices, and magazine suspension means carried by the main frame of the machine and arranged to intercept the magazine in its forward sliding movement.

23. A typographical composing machine including, in combination, an inclined matrix magazine, a base frame whereon the magazine is removably mounted, and means for locking the magazine against inadvertent movement off its base frame in an upward direction, said means including interlocking devices mounted at the underside of the magazine and on the base frame.

24. A typographical composing machine including, in combination, an inclined matrix magazine, a base frame whereon the magazine is removably mounted, and means for locking the magazine against inadvertent movement off its base frame in an upward direction, said means including a bar mounted at the underside of the magazine arranged to cooperate and interlock with means mounted on the base frame.

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