G. D. HARTLEY.

LINOTYPE MACHINE.

APPLICATION FILED SEPT. 8, 1906.

945,718.

Patented Jan. 4, 1910.

3 SHEETS—SHEET 1.

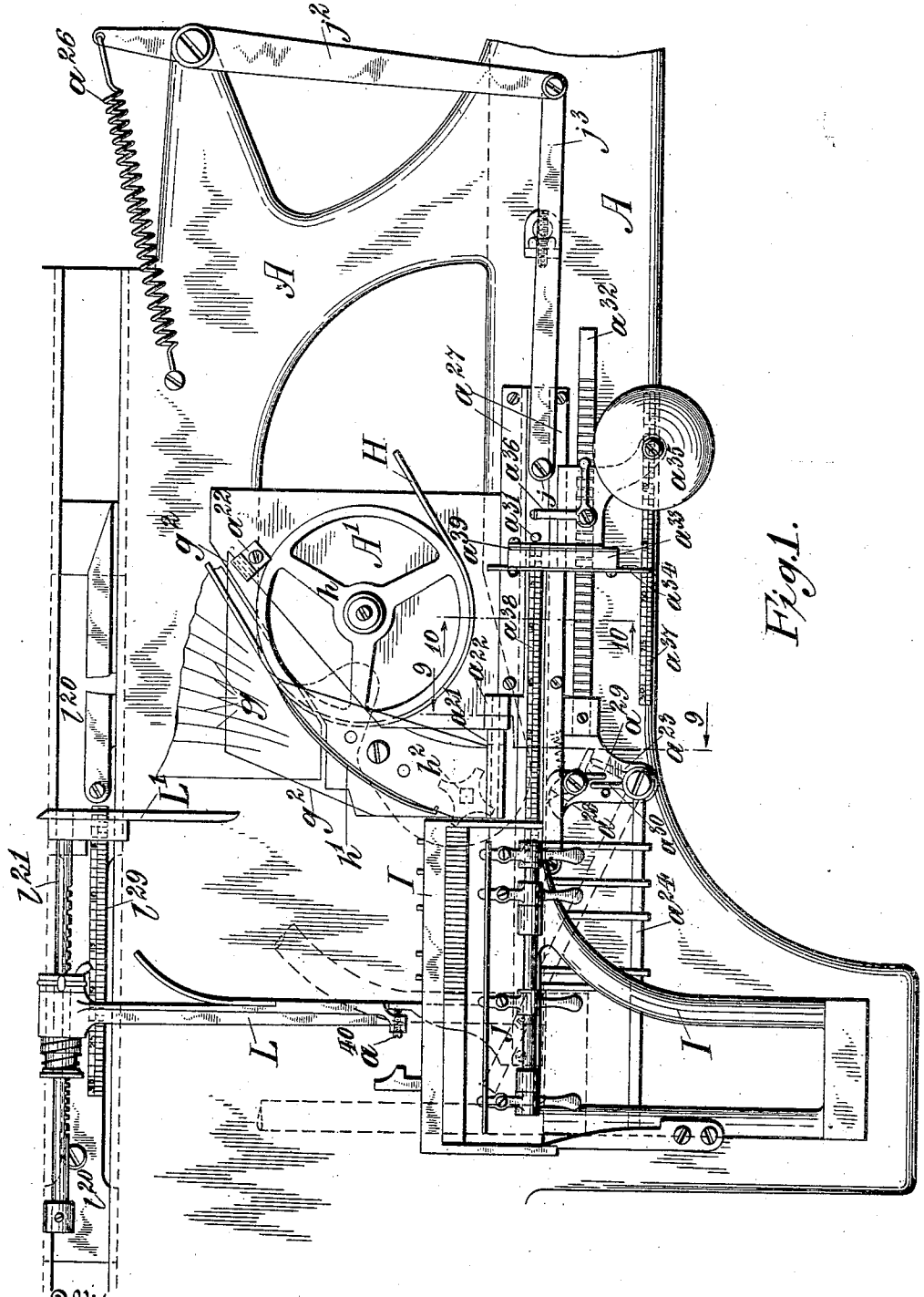

Fig. 1.

Witnesses

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3 SHEETS—SHEET 2.

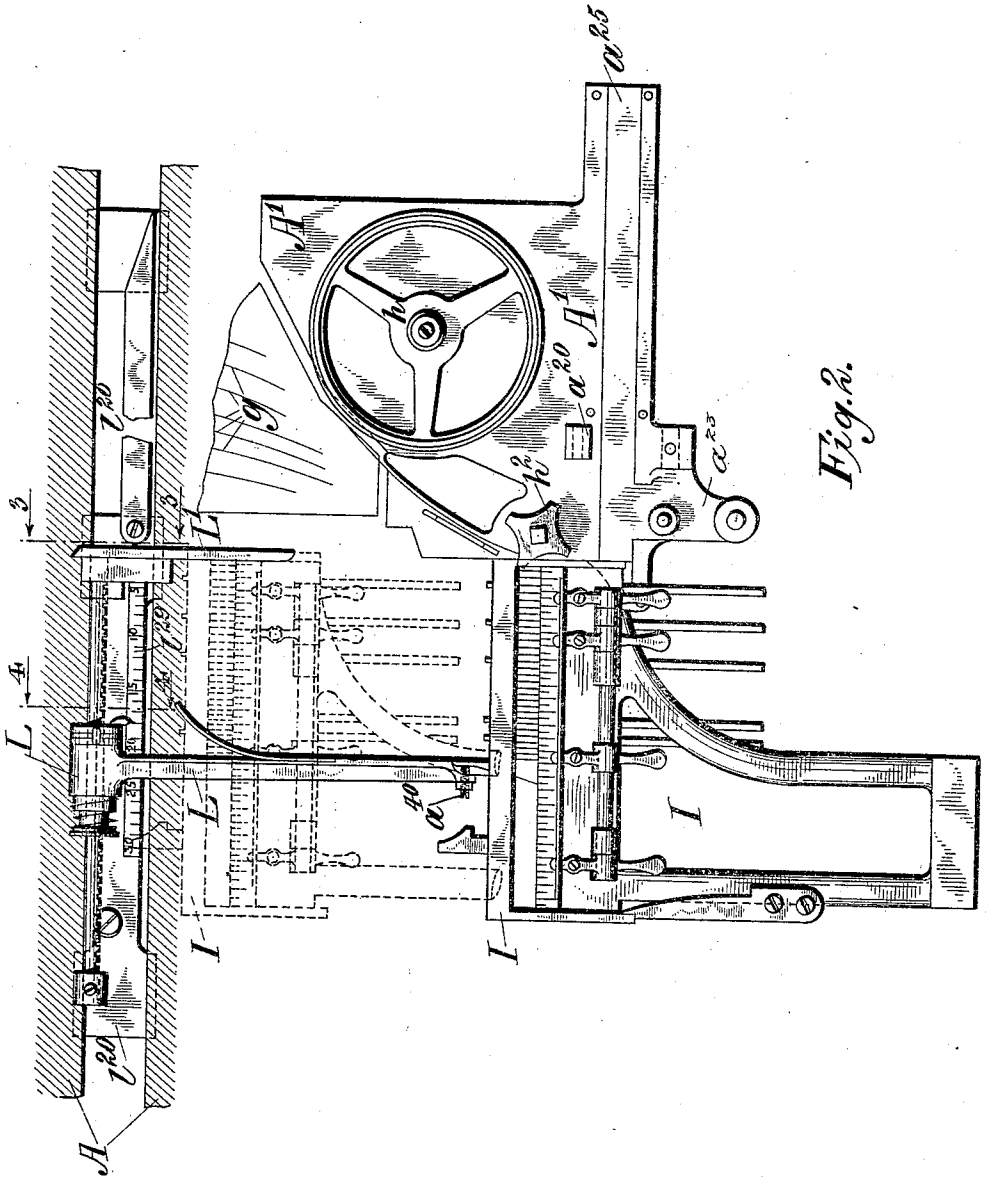

Fig. 2.

Witnesses
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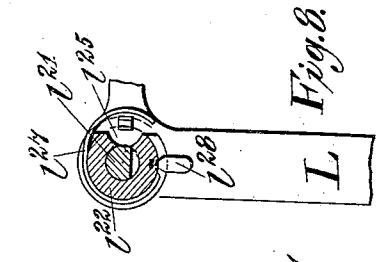

Fig.8.

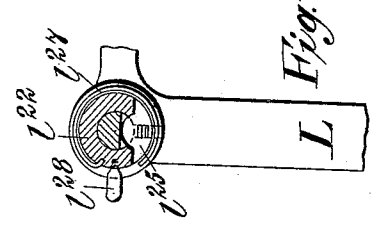

Fig.7.

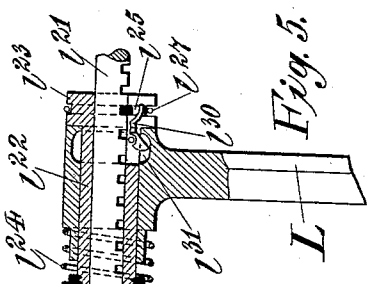

Fig.5.

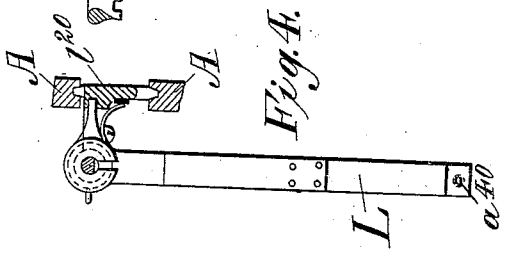

Fig.4.

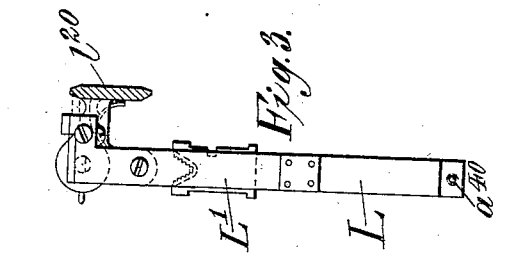

Fig.3.

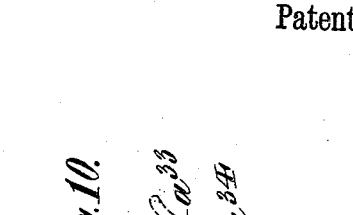

Fig.10.

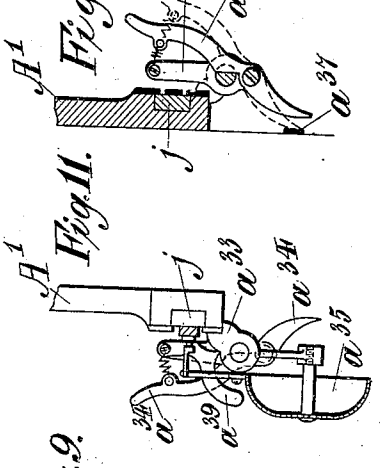

Fig.11.

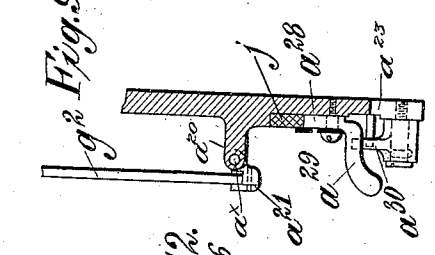

Fig.9.

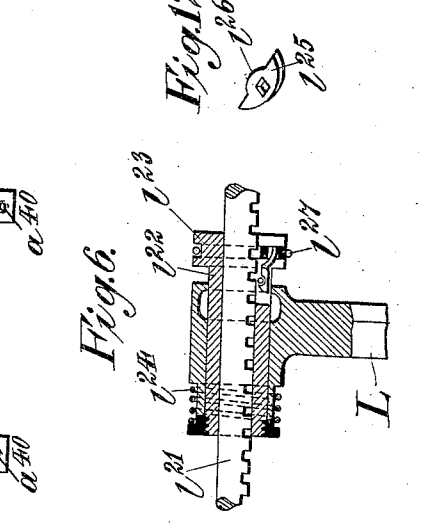

Fig.6.

Fig.12.

Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE DOWNING HARTLEY, OF MONTREAL, QUEBEC, CANADA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO MERGENTHALER LINOTYPE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

LINOTYPE-MACHINE.

945,718. Specification of Letters Patent. Patented Jan. 4, 1910.

Application filed September 8, 1906. Serial No. 333,759.

To all whom it may concern:

Be it known that I, GEORGE DOWNING HARTLEY, residing in the city of Montreal, in the 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.

The improvements relate to the line assembling and line delivery means of linotype machines and more particularly to the parts of these means which are usually referred to as "line slide" and the "line delivery carriage."

The general object of the invention is to improve these parts with a view toward making assembling and delivering of the line easier for the operator and to simplify largely the construction of the parts. In assembling the line, where the assembling means are arranged to limit the lines to a certain length, the operator often finds it desirable to lengthen the line by half a unit or so or to assemble a "tight" line or something of the sort. This could not be done heretofore without changing the adjustment of the assembling means whereby it was necessary before the next line was assembled to re-adjust said means. In the present case means are provided to permit the setting of tight lines and lines of extra lengths without necessitating any change of adjustment in the assembler means.

The means for adjusting the assembling devices are considerably improved and are entirely separate from the line slide. The latter is provided with a fixed stud or stop which coöperates with the adjusting means to limit the movement of the line slide, and the adjusting means are provided with an alarm which is operated automatically by said stud or stop just before the line slide reaches the limit of its movement.

In order to enable the operator to know at all times just what length of line remains to be filled in the assembler, a scale is provided and by means of this scale, he is able to tell, at any time during the composition of the line, just what space in the line remains to be filled. Another scale is provided in order to read the adjusting means and this scale is adapted to be read very accurately in a manner to be hereinafter explained.

The base plate casting of the assembler has been improved and is provided with means for sustaining the small assembler glass, it being horizontally pivoted on the base plate whereby it is very easily swung down or removed when necessary. An improved brake is provided for the line slide, which, as heretofore, is at all times urged backward by suitable means, and said brake is arranged to be released by the movement of a space band bar which acts as a buffer for the space bands as they fall and also prevents them from twisting and falling down should the front gate of the assembling elevator be opened by the operator during the composition of the line.

The line delivery carriage is provided with a movable finger which is so mounted as to be very readily adjustable. Means are also provided whereby this finger may be automatically released from the position in which it is secured, in case its lower end strikes an obstruction, such as the line itself, as the line delivery carriage is returned to its normal or first position. This often happens when the line is improperly delivered and results in the breaking or damaging of such finger.

All of the improvements will be described in detail hereinafter with reference to the accompanying drawings in which a convenient and practical embodiment of the improvements is illustrated.

In said drawings—Figure 1 is a view in front elevation of a portion of the front part of a linotype machine in which the improvements are embodied. Fig. 2 is a view, similar to Fig. 1, in which, however, some of the parts have been omitted. Figs. 3 and 4 are detail views, partly in section, and partly in elevation, the sections being taken on the planes indicated by the lines 3—3 and 4—4 in Fig. 2. Figs. 5 and 6 are views in longitudinal section through the bushing for the movable finger of the line delivery carriage. Figs. 7 and 8 are transverse sections through such bushing. Figs. 9 and 10 are sectional views, the planes of these sections being indicated by the broken line 9—9

and the straight line 10—10 respectively in Fig. 1. Fig. 11 is a view in end elevation looking toward the left in Fig. 1, the link connected to the line slide being shown in section. Fig. 12 is a detail view of a pawl employed to secure the adjustable finger of the line delivery carriage in position.

Referring to Fig. 2, a view of the general outline and form of the improved assembler base plate casting A′ may be had which, as is shown in Fig. 1, is secured to the main frame A of the machine. To this casting the journal for the assembler pulley h is secured, the latter carrying one end of the belt H upon which the matrices are fed into the assembling elevator I from the guide ribs g leading from the matrix magazine. As the matrices descend from the belt and the rails h' they are pushed into the assembling elevator by means of the usual angular or star wheel h^2 which is also preferably journaled upon the assembler base plate. In order to simplify particularly the construction and assembling of the machine, this base plate is constructed to support or sustain conveniently several of the parts which have to do with the assembling of the matrices and spacers into an assembled line for casting against. For this purpose, the assembler base plate is provided with a forwardly extending lug a^{20} (Figs. 1 and 9) in which is pivoted a holder a^{21} for the assembler entrance glass g^2, which normally rests in a vertical plane in front of the assembler belt, matrix rails and angular matrix wheel, as shown. This holder may comprise simply a straight rod or bar into which the lower edge of the assembler glass is set and preferably secured and which rod or bar is disposed horizontally, one end of the same being provided with a projection a^x which rests loosely in the lug a^{20} (Fig. 9). Said holder or support a^{21} for the assembler glass, as will be observed, is pivoted below the plane of the belt, rails and matrix wheel and the assembler glass, being thus horizontally hinged is adapted to be swung outwardly and down into a horizontal plane and thus removed from in front of the parts when necessary. When in its normal position in front of these parts, the assembler glass may be fastened by means of a clip or the like a^{22}. With such a construction, any choking of matrices in the matrix chute can be effectively dealt with, whereas in former constructions where the assembler glass was mounted so as to permit of only a slight displacement, the matrices, in case of a choking, were withdrawn only with difficulty and generally singly by the aid of a small instrument. In order to still further simplify the construction of these parts, the assembler base plate is provided with another lug or projection a^{23} (Figs. 1, 2 and 9) which extends downwardly and to which is pivoted what may be referred to as the space band bar a^{24}. This bar projects underneath the assembling elevator and normally rests in a horizontal position as indicated at Fig. 1. It serves as a buffer for the space bands as they drop into position in the assembling elevator; moreover, when for any reason the operator opens the front gate of the assembling elevator and thus takes away the front support of the space bands, the latter have a tendency to twist and also to fall forward and slip off the back rail of the assembling elevator. The space bands, in the present case, straddle the space band bar, (Fig. 1) and the space band bar thus also serves to retain the space bands against this tendency to twist or to fall forward when the front gate of the assembling elevator is open. As each line is completed and is elevated to the line delivery carriage, the space band bar is arranged to move upwardly to a certain extent, as indicated in dotted lines in Fig. 1.

The line slide j moves back and forth in a horizontal groove a^{25} in the assembler base plate, which is extended slightly for this purpose, being urged constantly backward by a spring a^{26} acting through a lever j^2 and a link j^3, and being retained in its groove by suitable plates a^{27}. On the extreme forward end of the slide is an upright finger J to sustain the forward end of the line as it is being assembled, which finger registers with the adjustable or movable finger L of the line delivery carriage. To hold the slide in any position against the action of its spring a^{26}, a spring actuated cam brake a^{28} is provided and may be pivoted to the assembler base plate A′, such brake being preferable to the usual ratchet and pawl and other forms of brakes for this purpose, for the reason that the slide is firmly held thereby in the exact position to which it is moved by the assembling devices. This brake has a short arm or finger a^{29} which is acted upon by a short arm or finger a^{30} secured to the space band bar a^{24}, when the latter moves upwardly upon the rise of the assembling elevator as heretofore explained, and in this way the brake releases the line slide and allows it to be drawn back to its original position by its spring a^{26}. The short arm a^{29} is extended slightly toward the front of the machine so that the brake may be conveniently released by the operator at any time.

In order to adapt the assembling mechanism to set lines of different lengths, or in other words to vary the limit of movement of the line slide, the line slide has a fixed stud or stop a^{31}, and an adjusting device is provided entirely separate from the line slide with which the stud comes in contact upon the completion of the line and prevents the further movement in a forward direction of the line slide. This adjusting device

comprises a toothed rod a^{32} suitably secured to the assembler base plate A′, a limiting block a^{33} which is adapted to move upon the toothed rod, and means upon the limiting block such as a pawl lever a^{34} adapted to engage between the teeth of the rod to hold the limiting block in the desired position. The teeth on the rod a^{32} are preferably uniform and one tooth and one space together are of the width of one pica em, or some other suitable unit, although if desired they may be of varying widths. The limiting block is preferably formed integral with a sleeve casting for the rod a^{32}, which sleeve casting has a downwardly projecting member to which an alarm bell a^{35} is secured so as to be sounded by a lever a^{36} pivoted upon said casting and operated by the stud a^{31} just before the line slide reaches the predetermined limit of its movement. The lever a^{34}, is normally held by a suitable spring (Fig. 10) in engagement with the toothed rod and, as will be obvious, serves to locate or secure the movable member or casting a^{33} in the desired position upon the toothed rod. In order to determine the position of this movable member upon the rod a^{32}, or in other words to determine the adjustment or limit of the line slide, a scale a^{37} is provided upon the frame of the machine in a fixed position with respect to the assembler base plate, and from Fig. 10, it will be seen that as the lever a^{34} is moved against the action of its spring to release the casting a^{33} from the tooth rod a^{32}, the lower end of the lever a^{34} will be brought in contact with the scale a^{37} whereby the reading may be easily and accurately made. Another scale a^{38} is provided in connection with the assembling devices whereby the precise position of the slide is always determined and the exact shortage in the line indicated, or in other words the length of the line which remains to be filled. This scale a^{38} is provided upon the line slide, and as will be obvious from Fig. 1, may be read from any suitable point upon the casting a^{33}, such as the rear side of the casting as illustrated in said figure.

As it is often desirable to compose a tight line or to increase the adjusted length of the line by one unit or by half of a unit, means are provided for this purpose which do not require any resetting of the line adjusting means. These means comprise a suitable thin strip or finger, preferably pivoted as a lever to the rear side of the limiting block a^{33}. In the present case there are two such strips each of which is of a thickness of a half a unit, and which strips are shown in Fig. 1 and Fig. 11 at a^{39}. By being located upon the rear side of the limiting block, the stud a^{31} comes in contact therewith and thus limits the farther movement of the line slide. If the operator desires to set a tight line or to increase the length of the line slightly he may raise either one or both of these levers a^{39} (according to the particular circumstances) and thus permit the line slide to move forward either one-half or a whole unit's length.

When the assembled line is elevated, it is received between the fingers L and L′ of the line delivery carriage which consists, in the present case, of a single piece slide l^{20} with the finger L′ rigidly secured thereto (and the finger L movable longitudinally) upon a rod l^{21}, which is suitably secured thereon in a fixed position. In order to change the position of the movable finger L with reference to the rigid finger L′, means are provided to adjust the position of the movable finger upon the rod l^{21} and will now be described. The movable finger is provided with a bushing or sleeve l^{22} having a head or enlarged end portion l^{23} against which head the finger, which embraces said bushing, is normally held by a spring l^{24}, a nut on the other end of the bushing holding the spring in place. The rod l^{21} is a toothed rod similar to the rod a^{32}, and a pawl l^{25} is provided in the head l^{23} of the bushing and said pawl has a central curved portion l^{26}, which is adapted to engage between the teeth of the rod being held normally in such engagement by the spring l^{27} (Fig. 5). It will be seen that the bushing can be turned upon the rod without turning the finger, and by giving the bushing a quarter turn, that is by turning it from the position illustrated in Fig. 7 to that illustrated in Fig. 8, by means of a handle l^{28} provided for this purpose, the pawl l^{25} will be disengaged from between the teeth on the rod, as will be obvious, and the bushing will be free to slide thereon and the finger L may be adjusted to the position desired. A scale l^{29} is provided upon the piece l^{20} in order to determine the adjustment of said finger L. As sometimes happens, when the line delivery carriage returns to its first position after having transferred the line from the assembling elevator to the second elevator, the long movable finger L strikes against an obstruction, such as the line itself if it has not been delivered properly, and is broken or otherwise damaged. To prevent the breaking of the finger L when it strikes such an obstruction, means are provided whereby the force of such a blow upon the end of the finger may be utilized to release the pawl l^{25} which fastens the movable finger L rigidly to the slide l^{20}. These means may comprise a pawl l^{30} the head of which rests in a recessed portion l^{31} around the bushing l^{22} and the toe of which engages the other pawl l^{25}, so that any blow which tends to move the finger L toward the left, (as seen in Figs. 1, 5 and 6), will cause the pawl l^{30} to act upon the pawl l^{25} in such a way as to withdraw it from between the teeth upon the rod l^{21}, thus permitting the

bushing to slide freely thereupon (Fig. 6). In this way, it will be clear that any accident to the finger L may be averted.

It will be observed that the long finger L meets the upwardly projecting finger J on the assembler line slide *j*. It is necessary that both of these fingers register quite exactly with each other, and for the purpose of adjusting them with respect to each other, an adjusting screw a^{40} is provided in one of the fingers, in the present case upon the end of the finger L. In this way the relative position of the ends of these fingers may be adjusted from time to time as required.

It will be clear that many changes may be made in the construction of the parts shown and described herein without departing from the spirit of the invention, and that the invention may be applied in machines of other constructions than that shown and described herein. The invention is not limited therefore to the construction shown and described nor to the embodiment or use in any particular form of linotype machine, nor to application to the particular form of line slides and line delivery carriages illustrated and set forth herein.

I claim as my invention—

1. In a linotype machine, the combination with the line slide, the assembler glass, and the space band bar, of an assembler base plate having an extended portion for the line slide, a lug for the assembler glass, and a lug for the space band bar.

2. In a linotype machine the combination with the line slide, the assembler glass and the space band bar, of an assembler base plate having a horizontally extended portion for the line slide, forwardly extending lug to which the assembler glass is hinged and a downwardly projecting lug to which the space band bar is pivoted.

3. In a linotype machine, the combination with the line slide having a projection at its end to sustain the line in process of composition, the assembler glass to retain the matrices as they pass through the matrix chute to the assembling elevator, and a space band bar to serve as a buffer and to maintain the space bands in position during the composition of the line, of an assembler base plate having a horizontally extending portion for the line slide, a forwardly extending lug to which the assembler glass is hinged, and a projection extending downwardly to which the space band bar is pivoted.

4. In a linotype machine, the combination of an inclined belt for delivering matrices, rails upon which the matrices descend, an angular wheel for advancing the matrices as they are received from the belt, and a glass in front of the belt, rails, and wheel, and hinged horizontally below the same.

5. In a linotype machine, the combination of a line slide, a toothed rod, means engaging the rod to limit the movement of the slide, a scale to determine the adjustment of said means with reference to the rod, and a scale to determine the position of the slide.

6. In a linotype machine, the combination of a line slide, means separate therefrom to vary the limit of its movement, a scale to determine the adjustment of said means, and a scale to determine the position of the slide.

7. In a linotype machine, the combination with the assembler base plate, of a line slide movable therein, means separate therefrom to vary the limit of its movement, and an alarm attached to said means.

8. In a linotype machine, the combination of an assembler base plate, a line slide thereon, means to vary the limit of the movement of the slide, a scale fixed with reference to the base plate to determine the adjustment of said means, and a scale moving with the slide to determine the position of the slide.

9. In a linotype machine, the combination of an assembler base plate, a line slide, a toothed rod on the base plate, a movable member on the rod, means engaging between the teeth on the rod to hold the movable member stationary, an alarm on said member, and a fixed stud on the line slide adapted to engage said member to check the slide and also to engage the alarm to operate the same.

10. In a linotype machine, the combination of an assembler base plate, a line slide, a toothed rod on the base plate, a movable member on the rod, means engaging between the teeth on the rod to hold the movable member stationary, a scale rigid with the base plate to determine the adjustment of the movable member with reference to the rod, and a scale on the slide to determine the position of the slide.

11. In a linotype machine, the combination of a line slide, a fixed stop thereon, a toothed rod, a movable member on the toothed rod, and a pawl carried by the movable member adapted to engage between the teeth on the rod.

12. In a linotype machine, the combination of a line slide, a fixed stop thereon, a toothed rod, a movable member on the toothed rod, a pawl on the movable member adapted to engage between the teeth on the rod, and a scale coöperating with the pawl.

13. In a linotype machine, the combination of a line slide, a fixed stop thereon, a toothed rod, a movable member on the toothed rod, a pawl lever on the movable member adapted to engage between the teeth on the rod, and a scale so arranged with reference to the pawl lever that the pawl lever will be brought into contact with the scale when it is moved from out between the teeth to disengage the movable member from the rod.

14. In a linotype machine, the combination of a line slide, a fixed stud thereon, a movable member adapted to be set in a predetermined position, and a thin strip or finger upon said movable member against which the stud is adapted to strike to stop the slide.

15. In a linotype machine, the combination of a line slide, a fixed stud thereon, a movable member adapted to be set in different positions for different lengths of lines, and a thin strip or finger pivoted to said member and against which the stud is adapted to strike to stop the slide.

16. In a linotype machine, the combination of a line slide having a fixed stop thereon, means coöperating with the stop to stop the line slide at a predetermined point, and a thin strip or finger pivoted to said means to lengthen slightly the movement of the slide.

17. In a linotype machine, the combination of a line slide, a fixed stud thereon, a movable member, a rod provided with teeth separated by spaces, means upon the movable member to engage in the spaces and hold the movable member stationary in different positions for different lengths of lines, and two strips or fingers pivoted to said member, each of which strips or fingers is equal to one-half the distance between said spaces.

18. In a linotype machine, the combination with means in which to assemble matrices and spacers and an elevator for the assembled matrices and spacers, of a space band bar underneath said means, and means to tilt the bar upwardly as the elevator moves.

19. In a linotype machine, the combination of a line slide, a space band bar pivoted to the machine, means to move said bar, and a brake for the line slide operatively connected with the bar.

20. In a linotype machine, the combination of an assembling elevator, a line slide, a pivoted cam brake for the line slide, a space band bar, an arm projecting from said bar and adapted to engage the brake, the assembling elevator as it moves to transfer the line operating to move the bar and release the brake.

21. In a linotype machine, a line delivery carriage having a toothed rod, a bushing upon the rod, means to secure the bushing to the rod, and a finger slidable upon the bushing.

22. In a linotype machine, a line delivery carriage having a toothed rod rigid, a bushing upon the rod, a pawl carried by the bushing and adapted to engage between the teeth of the rod, and a finger slidable upon the bushing.

23. In a linotype machine, a toothed rod, a bushing rotatable and slidable thereon, a pawl carried by the bushing and adapted to engage between the teeth of the rod, and yielding means to hold said pawl against the rod, the rotation of the bushing being adapted to draw the pawl out from between the teeth and to permit the bushing to be slid upon the rod.

24. In a linotype machine, the combination of a toothed rod, a bushing thereon, means in the bushing to engage between the teeth of the rod, a finger slidable upon said bushing and yieldingly held in a particular position thereon, a pawl engaging said means and operatively connected with said finger, whereby the sliding of the finger upon the bushing will cause the pawl to withdraw said means from between the teeth on the rod and permit the bushing to slide upon the rod.

25. In a linotype machine, the combination of a toothed rod, a bushing rotatable and slidable thereon and having an enlarged head, a pawl in the head to engage between the teeth on the rod, a finger slidable upon the bushing, yielding means to hold the finger normally against said head, said finger having a recessed portion around the bushing, a second pawl one end of which engages in said recessed portion and the other end of which engages the first pawl, whereby, when the finger is slid upon the bushing away from the head and against the action of its spring, the second pawl will be operated to withdraw the first pawl from between the teeth upon the rod and permit the bushing with the finger to slide upon the rod.

26. In a linotype machine, a line delivery carriage having a movable finger, means to secure the finger in its adjusted position, and means to release said finger from its adjusted position under excessive pressure.

27. In a linotype machine, a line delivery carriage having a movable finger, a toothed rod, means to effect a positive engagement between the finger and the toothed rod, and means operated automatically by pressure upon the finger to disengage said finger and toothed rod.

28. In a linotype machine, the combination with the line slide and the line delivery carriage, said slide having a finger to hold the line and said carriage also having a finger to hold the line, of a screw in one of the fingers to adjust the relative positions of the two fingers.

This specification signed and witnessed this fourth day of September A. D. 1906.

GEORGE DOWNING HARTLEY.

Signed in the presence of—

R. H. TEARE,

C. J. E CHARBONNEAU.