(No Model.) 3 Sheets—Sheet 1.

E. BERTRAM & E. SANDERS.

LINOTYPE MACHINE.

No. 563,643. Patented July 7, 1896.

Fig 1

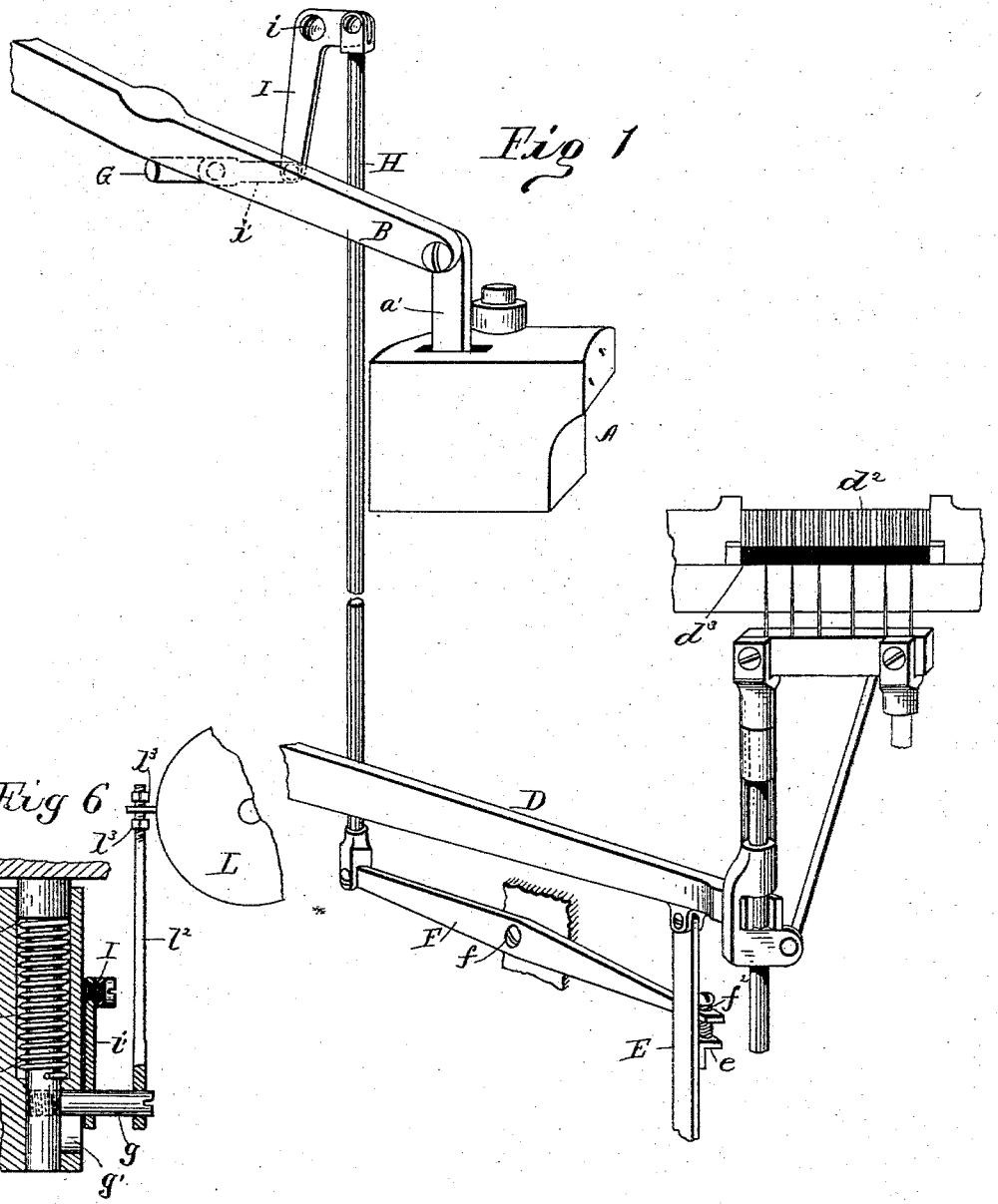
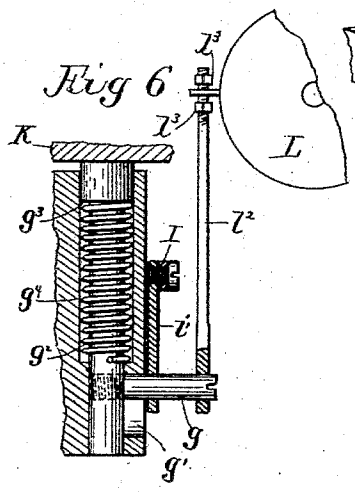


Fig 6



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

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LINOTYPE MACHINE.

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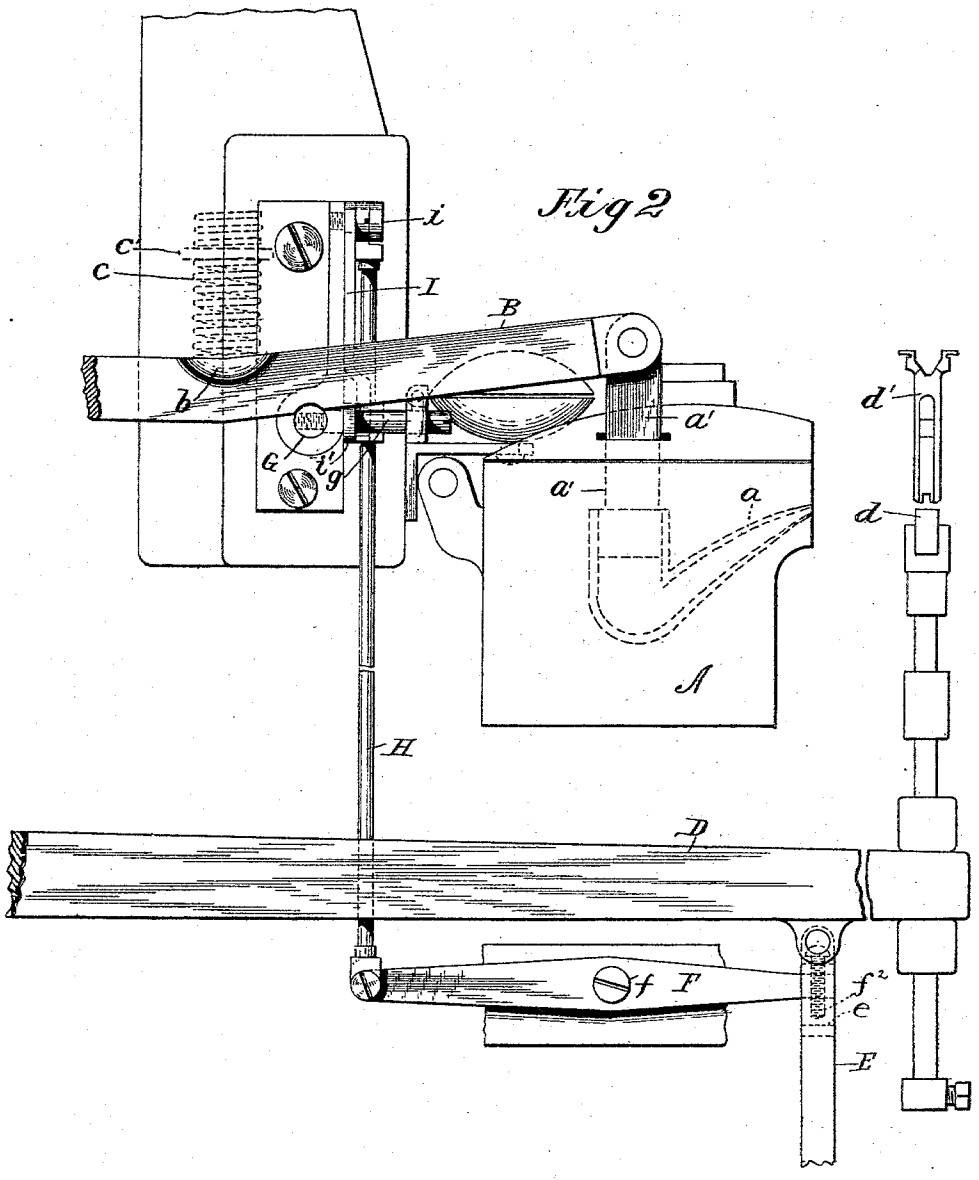

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(No Model.) 3 Sheets—Sheet 3.

E. BERTRAM & E. SANDERS.

LINOTYPE MACHINE.

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Fig 4

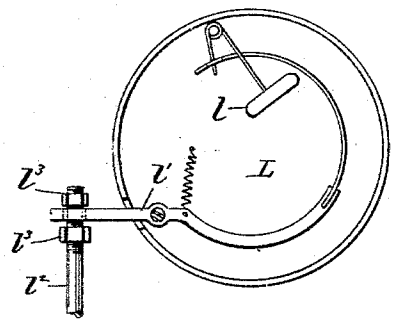


Fig 3

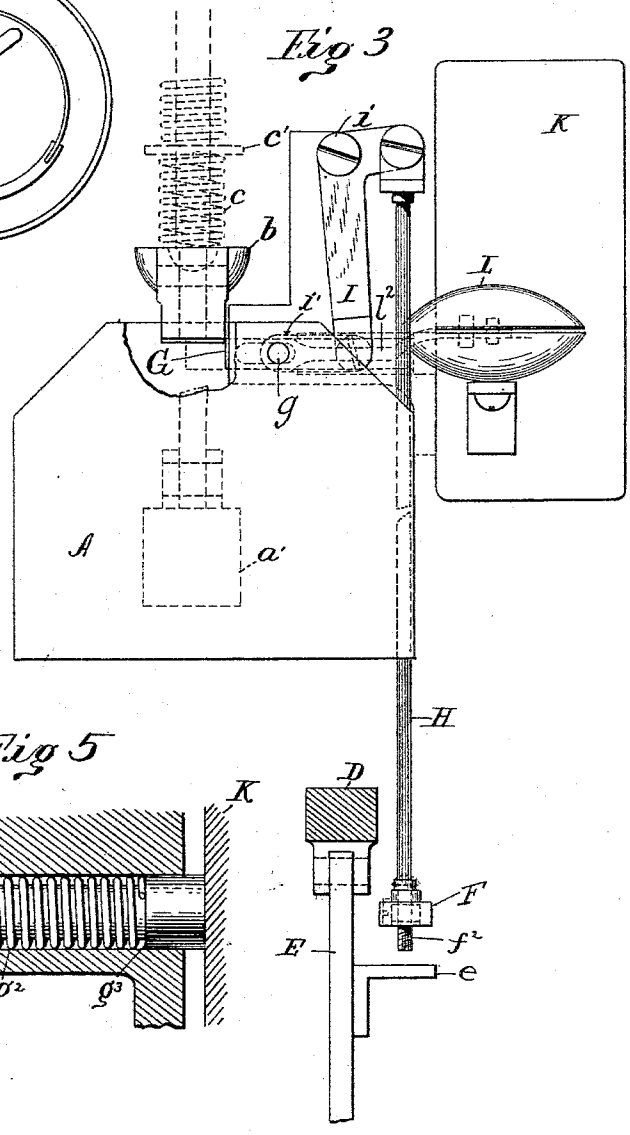
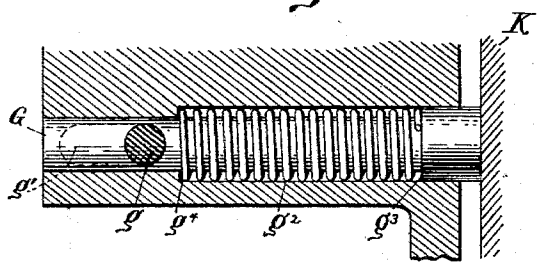


Fig 5



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UNITED STATES PATENT OFFICE.

ERNST BERTRAM AND ERNST SANDERS, OF NEW YORK, N. Y.

LINOTYPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 563,643, dated July 7, 1896.

Application filed December 28, 1892. Serial No. 456,559. (No model.)

To all whom it may concern:

Be it known that we, ERNST BERTRAM and ERNST SANDERS, citizens of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Linotype-Machines; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to the class of machines known as "linotype," of which the Mergenthaler machine, substantially as shown in Patent No. 436,531, granted September 16, 1890, is a type, although the said invention is equally applicable to the machine known as the "Rogers Typograph," and, in fact, to all those whose function it is to cast a line-stereotype, otherwise known as a "linotype" or "type-bar."

The object of the present invention is to provide means, in connection with and under the control of the justification mechanism, whereby the casting operation is prevented whenever the line of matrices in front of the mold is not completely filled out after the justifying operation has been completed—that is to say, after the double-wedge spaces between the matrices have been spread laterally to their utmost extent and there still remain gaps or crevices, however slight, between any two matrices, or between the spaces and the matrices, into which gaps the molten metal would flow to form fins were the pump to act under such conditions. For this purpose a device embodying our invention in its preferred form embraces a locking device or catch, such as a locking-bolt, adapted to be operated to stop or lock the plunger of the metal-pump, preferably by being projected outwardly under the pump-lever of the metal-pot (from which the molten metal is injected into the linotype-mold) whenever the justification-lever has moved the full extent of its stroke. It never makes a stroke when the mold contains a sufficient number of matrices, inasmuch as under such conditions the double wedges against which the justification-lever acts, would be expanded laterally to such an extent as to arrest the lever before it has completed its stroke, as will be readily understood by those familiar with these machines. We provide the justification-lever for this purpose with an arm or shelf, which when the lever makes a full stroke bears against and rocks another lever, which in turn is connected with a bell-crank lever suitably connected to the pump-lever lock-bolt.

Our invention also embraces an alarm, which may be of any well-known or suitable form, and which is so connected with the casting mechanism that it will sound to notify the operator that no line has been cast; and my invention embraces such further means, combinations of parts, and features as will be hereinafter more particularly pointed out in the claims.

In the drawings accompanying this specification, Figure 1 is a diagram showing the relation of the justification mechanism to the linotype-casting mechanism and to the pump-lever-stopping mechanism, interposed between the two in the preferred embodiment of our invention; Fig. 2, a side elevation of the said pump-lever-stopping mechanism and so much of the adjacent mechanism as necessary to show its operation; Fig. 3, a front elevation, partly in section, of the same; Fig. 4, a detail view of the interior of the alarm-bell and its immediate mechanism; Fig. 5, a detail sectional view of the pump-lever-locking bolt, and Fig. 6 a top sectional view of the connecting mechanism between the alarm and the locking-bolt.

In the drawings, A represents the metal-pot, from which the molten metal is injected into the linotype-mold through the nozzle *a* by the depression of the piston or plunger *a'*, which, as shown, is connected with the pump-lever B for this purpose. The pump-lever B is actuated by the pump-spring rod C, which at the moment of casting is yieldingly forced downwardly upon the same by the compression of the pump-spring *c*, bearing upon the washer *c'* on the pump-spring rod, as in the aforesaid Mergenthaler machine. For the purpose of preventing the pump-spring rod C from slipping off from the pump-lever B the latter is provided with an enlargement *b*,

having a socket in its top, which is engaged by the end of the pump-spring rod C.

D represents the justification-lever, which at the proper time is by well-known mechanism actuated to advance the justifying-slide d, which causes the spacing-bars, usually in the shape of double wedges d', to be expanded to justify the line of matrices d^2 and thus cause them to fill out the mold. The stroke of the justification-lever, as is well known, is yielding and variable and its extent of movement is governed by the degree of lateral expansion which it is necessary to impart to the double-wedge space-bars d' to completely and compactly close up the line of matrices in front of the mold d^3.

The mechanism thus far described is old and embodied in one class of linotype-machines now in use. We will now proceed to describe that part of the mechanism which embodies our invention in its preferred form.

By referring to Figs. 1, 2, and 3 it will be noted that the justification-lever D is provided at its forward end, which rises when the said lever makes its stroke for justifying, with a depending arm or rod E, which arm is provided with a horizontal lug or shelf e. In the path of said lug e is arranged the end of a lever F, fulcrumed at f in any fixed part of the machine; and this lever F is by intermediate mechanism connected with a locking device or catch in the form of a lock-bolt G, guided in a suitable casing in a fixed part of the machine, and so arranged that when it is thrust outwardly, as indicated in dotted lines in Fig. 3, it will lie under the pump-lever and thus lock the same.

The mechanism which we prefer to employ for this purpose consists, essentially, in a pitman H, connecting the arm of lever F, opposite to the horizontal shelf e, with a bell-crank I, pivoted at i and connected by a link i' with a stud g, projecting laterally through a slot g' in the casing, in which the lock-bolt works. In order to retain the forward end entirely within the casing when the same is not positively thrust outwardly by the mechanism just described, we provide the same with an automatic returning mechanism, preferably in the form of a spring g^2, encircling the bolt G, which bears against a rear shoulder g^3 on the lock-bolt, and a forward interior shoulder g^4 in an enlarged portion of the casing, adapted to receive the spring g^2.

In order to prevent the stud g from being loosened and the mechanism depending thereon from becoming disarranged or injured by the said studs striking against the sides of the slot g', we make said slot somewhat longer than the stroke of said stud and so that the same will not strike the end walls of the said slot at either stroke, and we preferably arrange the casting or other fixed part K of the machine, on which the alarm, to be hereinafter described, may be mounted, in such a position that the rear end of the bolt G is arrested by and abuts against said casing when the locking mechanism is not in operation, as shown in full lines in Fig. 5.

In order to be able to accurately adjust the precise point in its upward stroke when the lug e will act upon the lock-bolt G, through the intermediate mechanism, we provide the lever F with a stroke-adjusting screw f^2, against whose end the lug e bears when the justification-lever makes a full stroke.

In order to notify the operator that the pump-lever has been locked, and hence that no line has been cast, we connect an alarm L with the pump-lever-locking mechanism, which alarm may be of any suitable or desired form, and may consist of a gong, as shown, adapted to be struck by a hammer l, whose tripping-lever l' is connected with the stud g on the lock-bolt G by a connecting-rod l^2, which connecting-rod may be provided at its end with two adjustable nuts l^3, between which the tail of the tripping-lever l' is held.

The mechanism thus described operates as follows: When the justification-lever D makes its stroke to justify or fill out the line under ordinary circumstances, that is to say, when the line of matrices and spaces in front of the mold is caused to completely and compactly close the mold, the said justification-lever is arrested midway of its stroke because the justifying-slide will go no farther, and the metal pump is permitted to force the metal into the mold in the ordinary manner. When, however, there are not sufficient matrices and spaces or not matrices in line in front of the mold, and the operator attempts to start the mold, the justifying-slide d is not stopped by the double-wedge spaces, and hence the justification-lever can make a full stroke, and thus strikes the lever F through the medium of the adjusting-screw f^2 on the same, and by drawing down the pitman H tilts the bell-crank I, which in turn thrusts the lock-bolt G out of its casing directly under the pump-lever B, as shown in dotted lines in Fig. 3. The pump-lever B is thus locked and no metal can be injected into the mold. At the same time the alarm L is sounded by virtue of the connecting-rod l^2, which, through the intermediate mechanism described, trips the hammer of the alarm, thereby notifying the operator that no line has been cast. As soon as the justification-lever returns to its position of rest and the locking mechanism is released, the lock-bolt, by the spring g^2, is drawn from under the pump-lever B and into the casing, and the machine is in position to cast the next line when properly assembled and justified. By this automatic pump-lever-locking mechanism we attain the important advantage of effectually preventing the casting of defective linotypes having fins on their faces, and hence worthless, and enable the operator to correct his work as the same proceeds and without first casting such linotypes and necessitating their inspection.

While we consider the mechanism above described the best embodiment of our invention,

it is manifest that the same may be modified in many ways without departing from the scope and spirit of said invention. Thus, for example, instead of the locking-bolt, other locking or stopping devices or catches may be employed. It is to be observed, however, that all that is essential is to lock, stop, or arrest the pump piston or plunger a', through the action of the justification mechanism, and that therefore any device under the control of the justification mechanism which will arrest the said pump will be an equivalent of our locking-bolt and its arrangement, which has only been shown and described as an illustration of our invention.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In combination with the pumping and justification mechanism of a linotype or type-casting machine, an automatic locking or arresting device controlled by said justification mechanism, whereby the casting operation is prevented, substantially as described.

2. In a linotype or type-casting machine, an automatic lock, and an alarm connected therewith, in combination with and under the control of the justifying mechanism, whereby the casting operation is prevented and the operator notified when the line is not filled out or the molds are empty.

3. In combination with the pump-lever and justifying mechanism of a linotype or type-casting machine, a locking-bolt, and an alarm connected therewith and under the control of the justification mechanism, as and for the purpose specified.

4. In a casting-machine, a metal-pot, a piston or plunger, a locking device, adapted to be operated to lock the piston, in combination with a justification-lever, and means interposed between the justification-lever and the locking device for actuating the same, substantially as described.

5. In a casting-machine, a pump-lever for actuating the pump of a metal-pot; and a justification-lever, in combination with a locking device for the pump-lever, and means interposed between the pump-lever and the justification-lever, whereby the justification-lever will cause the locking device to operate when the justification-lever exceeds its normal stroke, substantially as described.

6. In a casting-machine, a pump-lever and a justification-lever, in combination with a locking-bolt adapted to be projected under the pump-lever, a bell-crank, and means between the bell-crank and the justification-lever for operating the bell-crank when the justification-lever exceeds its normal stroke, substantially as described.

7. In a casting-machine, the combination of the following parts: A justification-lever; a lug as *e*, connected therewith, a lever as F, a bell-crank, a pitman connecting the bell-crank with the lever F, a locking-bolt connected to the bell-crank, and a pump-lever, the locking-bolt being so arranged as to stop the pump-lever when it is projected by the bell-crank, substantially as described.

8. In combination with the justification and pumping mechanism, a pump-lever-locking bolt provided with a lateral stud, a casing for the locking-bolt, which casing is provided with a slot through which the lateral stud projects, the length of the slot being greater than the throw of the lateral stud, so that the same will strike neither end wall of the slot in its reciprocations, substantially as described.

9. In a casting-machine, a pump-piston, and a locking device adapted to lock or arrest the pump-piston, in combination with an alarm, and a connecting-rod arranged between the locking device and the alarm, whereby the alarm is sounded whenever the pump-piston is locked or arrested, substantially as described.

10. In a casting-machine, a pump-lever and a locking-bolt adapted to be projected under the pump-lever, in combination with an alarm, and a connecting-rod between the alarm and the locking-bolt, whereby the alarm is sounded whenever the pump-lever is locked by the locking-bolt, substantially as described.

11. A justification-lever provided with a lug or shelf, and a lever such as F, in combination with a pump-locking mechanism, substantially as described, said lever being provided with an adjusting-screw, such as f^2, to accurately time the action of the pump-locking mechanism.

12. In a line-casting machine, the combination of a pump, a stop device to prevent the action of the pump, and means controlled by the line of matrices to determine the action of the stop device.

13. In a linotype-machine, the combination with a pump-stop device, of an automatic alarm mechanism adapted to sound upon the failure of the machine to cast a line.

14. In a linotype-machine, and in combination with the casting mechanism, an automatic alarm device arranged to sound upon the failure of the machine to cast a line.

In testimony whereof we affix our signatures in presence of two witnesses.

ERNST BERTRAM.
ERNST SANDERS.

Witnesses:
H. ADOLPH WINKOPP,
LOUIS BOHNER.