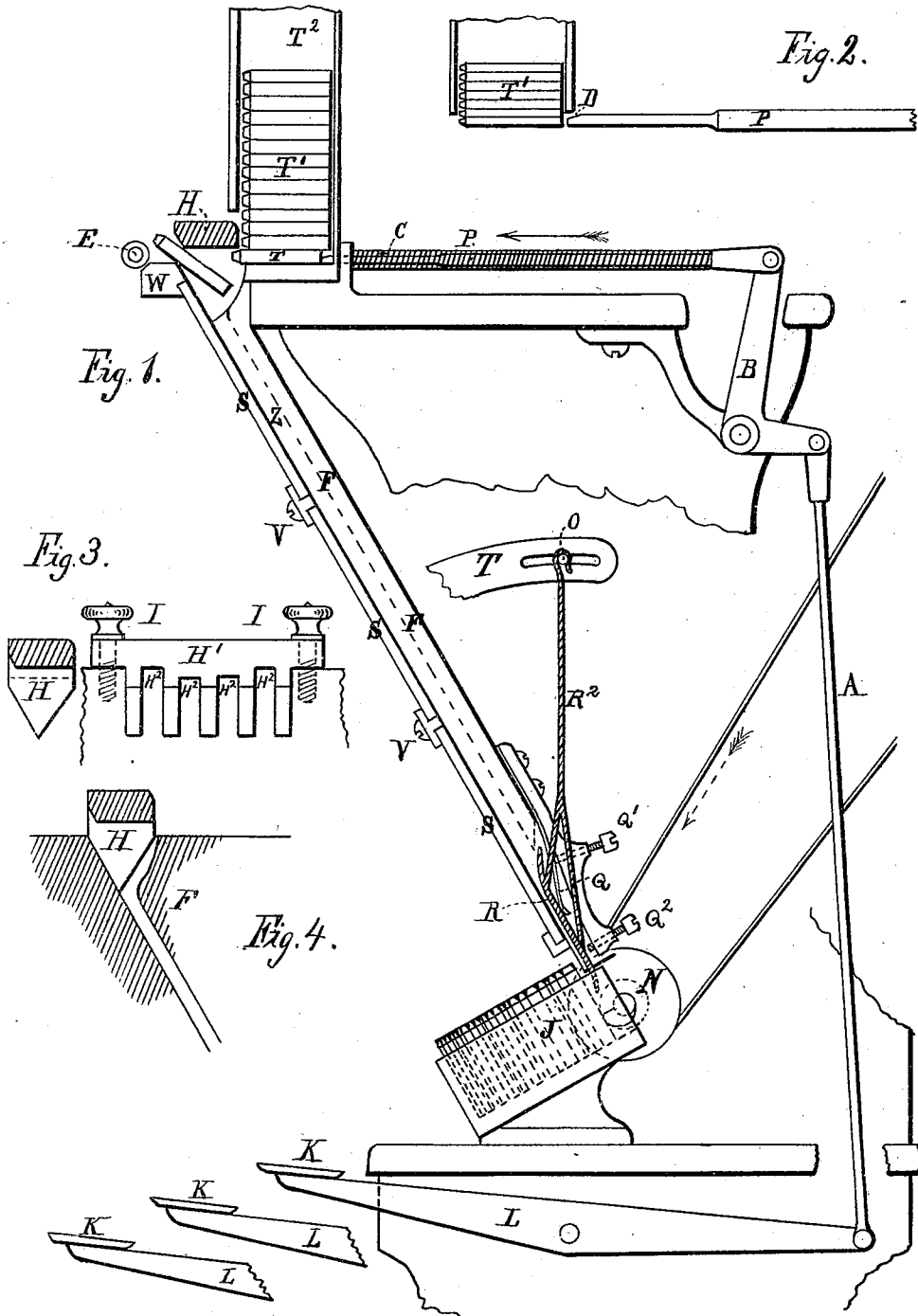


W. A. LORENZ.
TYPE SETTING MACHINE.

No. 174,916.

Patented March 21, 1876.



Witnesses:
John H. Crone
Geo R. Lefferts

Inventor
William A. Lorenz.

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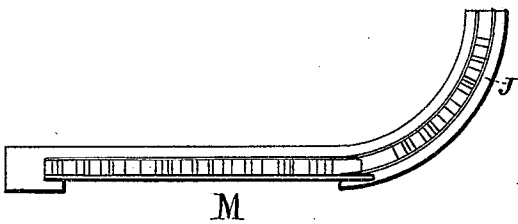
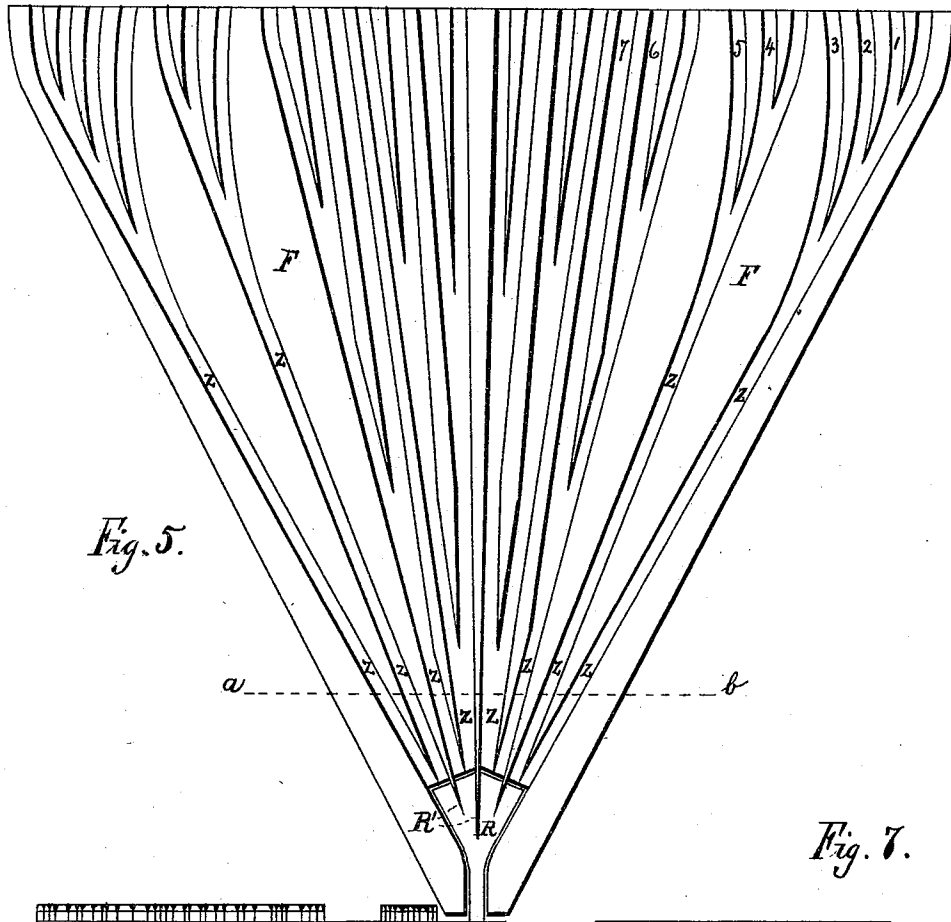


Fig. 6.

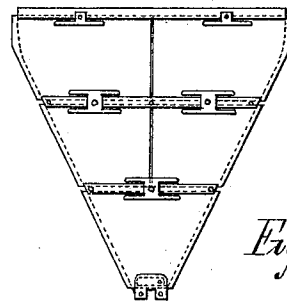
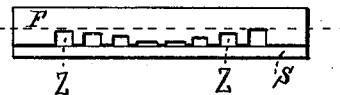


Fig. 8.

Witnesses
John McBrone
M. R. Lefferts

Inventor.
William A. Lorenz

UNITED STATES PATENT OFFICE.

WILLIAM A. LORENZ, OF NEW YORK, ASSIGNOR TO SAMUEL W. GREEN, OF BROOKLYN, AND SAID GREEN ASSIGNOR TO EDWARD N. DICKERSON, OF NEW YORK, N. Y., TRUSTEE FOR HENRY A. BURR.

IMPROVEMENT IN TYPE-SETTING MACHINES.

Specification forming part of Letters Patent No. **174,916**, dated March 21, 1876; application filed July 15, 1875.

To all whom it may concern:

Be it known that I, WILLIAM A. LORENZ, of New York City, N. Y., have invented a new and useful Improvement in Type-Setting Machines, of which the following is a description:

My improvements are in that class of type-setting machines in which the types are supplied to the machine in channels, each holding its own denomination of types, the types lying on each other side upon side in a vertical pile, and the lowest one being pushed out from beneath the pile by a plunger, and allowed to fall through a groove into a race or narrow channel as wide as the width of the types, which supports the types that drop into it, and along which they are driven by some suitable mechanism.

The special object of my invention is to overcome the practical difficulties which have been heretofore found in type-setting machines constructed upon the same general plan, and to make such a machine practically operative.

In the accompanying drawings, Figure 1 represents the operative parts of such a machine in section, in which T^1 represents a pile or row of types in a channel of the case T^2 . P represents a plunger, which is driven against the end of the bottom type of the pile by the key K , pressed by the finger of the operator, through the lever L , the rod A , and the bell-crank B , and which is withdrawn, when the finger is removed, by a coiled spring, shown in the drawing at C , substantially in the manner described in the patent No. 16,947, to William H. Houston, dated March 31, 1857, extended March 23, 1871.

The front end of this plunger must necessarily be thin enough to eject but one type at a time, which type may be very thin, and if its whole body be made as thin as this end the plunger will be weak and liable to break. In my invention the main body of the plunger is made of a sufficient thickness and strength, and its front end is beveled, as shown in the drawing at Fig. 2, so that its point is thinner than its body. If the types of any pile are thinner than the body of the plunger, the

plunger, as it drives out the lowest letter, lifts the whole pile above that letter a little, and as it is withdrawn allows the pile to drop. As the type are pushed out by this plunger through the slots or grooves of the guide-bar H the faces of them are stopped by the covered roller E , and the bases of the types being unsupported, they fall, base down, over the bar W , against the glass front plate S , and slide down on that plate, through conducting-channels in the back plate F , until they drop into the race J .

While the types are in the state of transition from their holding-channels to their conducting-channels in the back plate, it is necessary to control them, and for that purpose a guide-bar, H , Figs. 1, 3, and 4, is arranged in the open space in front of the foot of the type-holding channels. This guide-bar has slots or grooves cut through it, as seen in Fig. 3, at H^2 , each of which is high enough to permit the passage of one of its appropriate types through it, and not high enough to permit the passage of more than one at a time, so that the plunger cannot push out two types at once. This guide-bar is in sections, and each section is secured by thumb-screws I to the frame of the machine, so that it can be readily removed and replaced.

The glass front plate S is made in sections, instead of in one piece, and each section is secured independently of the others by clamps V , which are fixed to the plate F at convenient positions, so that each glass section can be withdrawn at pleasure by sliding it out of its grooves.

When the types fall into the race J , they are pushed along in it by a revolving cam, N , or other suitable means, so as to make room for succeeding types, and are ultimately forced into the "stick" M , which is arranged, as shown in Fig. 6, to receive the forming line of types, and to be removed when full, giving place to an empty one, without stopping the machine. This stick may extend in any direction, but it is preferable to curve the race, as in Fig. 6, so that the stick may lie parallel with the front of the machine. My improvements will be found in the construction of the

ger P, in the removable guide-bar H, in covered roller E, in the peculiar construction and arrangement of the conducting-channel through which the types fall, in the glass plate made in sections, and in the gate formed by the plate R, in connection with the front plate S, through which the types are delivered to the race.

One of the great difficulties which has been encountered in constructing type-setting machinery is, that the types, in their passage through their holding-channels to the race, are liable to be turned so that they will either pass or will be turned one-quarter or half way around while dropping, and, therefore, it is necessary, in a practical type-setting machine, to guard the types at all stages of their movement from their holding-channels to the race, so that they will be kept in proper position. In my machine that object has been accomplished by devices which are appropriate to the different stages of operation, and which successfully prevent the types from being turned. The first of these devices is to be found in the construction of the conducting-channels through which the types fall; and it consists in making those conducting-channels of different depths, as in Fig. 7, corresponding with the thickness of different types, which vary very much. The result of this construction is, that each type is confined in a channel which, both in height and depth, corresponds with the thickness and width of the type which is to pass through it, so that, practically, a type cannot be turned while it is passing through its channel. In the accompanying drawings, these conducting-channels are shown in elevation at Fig. 5, and in section at Fig. 7, which section is taken through the grooved plate at the line A-B.

I divide these conducting-channels into two groups. I call leaders and confluent, the leaders being lettered Z, and the confluent numbered 1, 2, 3, &c. The object of this arrangement is to group together the conducting-channels of a number of types of nearly the same thickness, which may be all carried through one leader, whose depth shall be as great as the thickness of the thickest type of the group, but not great enough to allow the thinnest type to turn in it. The leaders Z may be eight, or less, in number, and converge at the front of the front plate, without each running into the other. The confluent generally meet with the leaders in a curve, to which each leader is a tangent, so that no type may be required to suddenly turn an angle in its descent.

These leaders and these confluent are so arranged that the heaviest type are grouped on the outer and the lightest type at the inner conducting-channels. The object of this grouping is to compensate for the additional length increased atmospheric resistance of the grooves by passing the heaviest type through them, so that the type shall follow each other at the gate R practically in the

same order of succession as that in which the operator strikes the keys. I have found that this arrangement is important in preventing the types from colliding at the gate, and thus arresting the action of the machine.

The second device for keeping the types in the proper position is required at the point of convergence of all the conducting-channels which are delivering types, and where all the types of varying thickness must pass through a common delivery-passage, and where, therefore, it is necessary that the passage should vary in depth as the type vary in thickness. This result is produced by a movable plate or gate, R, whose normal position is parallel to the glass front plate of the machine, and which is movable, so as to recede from or approach the glass front plate sufficiently to permit the thickest type to pass between the glass front plate and it, and also to contract the passage so that the thinnest type cannot turn in passing. This plate is so arranged that as the types come down through the conducting-channels, they are brought under its control before they have passed entirely out of the conducting-channels, so that no opportunity is given them for turning. One or more divisions of the back board F is tapered to a point, R¹, and extends down over this plate or gate R, and prevents the types from turning as they pass between it and the glass front plate, as in Figs. 1 and 5. This plate R fills up an opening in the bottom of the back plate F, and is suspended by a rod, R², to a pin, O. This pin is made adjustable to and from the front of the machine in a slotted bracket, T, so as to cause the plate R to press more or less, by force of gravity, against the types which are passing between it and the glass front plate. A spring, Q, is also applied to the back of this plate, and its tension is regulated by the set-screw Q¹, the object of which is to control and adjust the pressure of the plate R, so that while it will permit the types to pass freely under it, it will yet press upon them enough to prevent them from turning. The spring also acts more rapidly than gravity, and therefore restores the plate to its position, after it has been pressed back by a thicker type, more quickly than gravity would do it. The set-screw Q² prevents the plate R from being thrown back further than necessary for the passage of the thickest type which may be in the front on which the machine is working.

It is apparent that this apparatus must be very delicate and rapid in its action, because the only force which operates to move it is that derived from the falling of the type down the inclined glass front plate, and because the varying thicknesses of types follow each other so quickly that the interval between them, during which the gate must adjust itself to the constantly-changing conditions, is scarcely appreciable.

Other difficulties overcome are those which result from pushing the types out of the holding-channels rapidly by the plunger P against

a fixed stop. When that stop is of metal or other hard substance, there is danger that the type will be bruised against it; and when its surface is of a softer material, as leather, a type being constantly pushed upon the same spot cuts into the softer material, dirt accumulates, and the types are in danger of sticking, and so not falling at the proper time. These difficulties I have overcome by using a roller, E, which I prefer to cover with india-rubber, or some material softer than metal, against which the faces of the types strike as they are driven out of the holding-channels, and which revolves a little as the types strike it. This prevents the stop from wearing away, and the types from bruising or sticking, and insures their falling.

The arrangement of the glass front plate in sections I also find a very important improvement upon its original construction in a single sheet. The time of the falling of the type is an essential factor in the result, and the character of the surface upon which the type slide in their descent materially affects it. When the glass front plate is in one piece, it is very difficult either to make or keep it true, so that uniformity of action is not secured. It is often necessary to remove this glass front plate, either to clean its inner surface or to clear out the conducting-channels, and in replacing it there is danger of springing or breaking it. My improvement consists in dividing this plate into sections, and so forming and securing them that they may be slid in and withdrawn from grooves or clamps fixed upon the face of the back plate, Fig. 8. In the drawing, V represents these clamps which support the glass front plate, and which secure the uniformity of the surface upon which the types slide.

These clamps are secured to the portions of the back plate unoccupied by the conducting-channels, and firmly hold the glass section at a number of points, so that they cannot spring off.

What I claim as my invention is—

1. In combination with the type-case, the plunger for ejecting the type, made thicker than the thickness of the thinner type to be ejected, and tapered at its end, substantially as described.
2. In the combination of a type-case, ejector, and stop, the improved stop, consisting of the revolving roller E, for the purpose of arresting the motion of the type when ejected, substantially as described.
3. In combination with the grooved back plate, the glass front plate made in sections, each removable independently, substantially as described.
4. In combination with the type-case, the removable guide-bar H, secured by thumb-screws, or an analogous device, substantially as described.
5. In combination with a back plate having grooves of varying depth, the type arranged so that the heavier type shall travel through the longer grooves, and the lighter through the shorter ones, substantially as described.
6. The combination of the pendulum suspender and the adjustable spring for the purpose of controlling and making sensitive the vibrations of the gate, as the varying thicknesses of type pass through it, substantially as described.

WILLIAM A. LORENZ.

Witnesses:

JOHN MCCRONE,
SAMUEL W. GREEN.