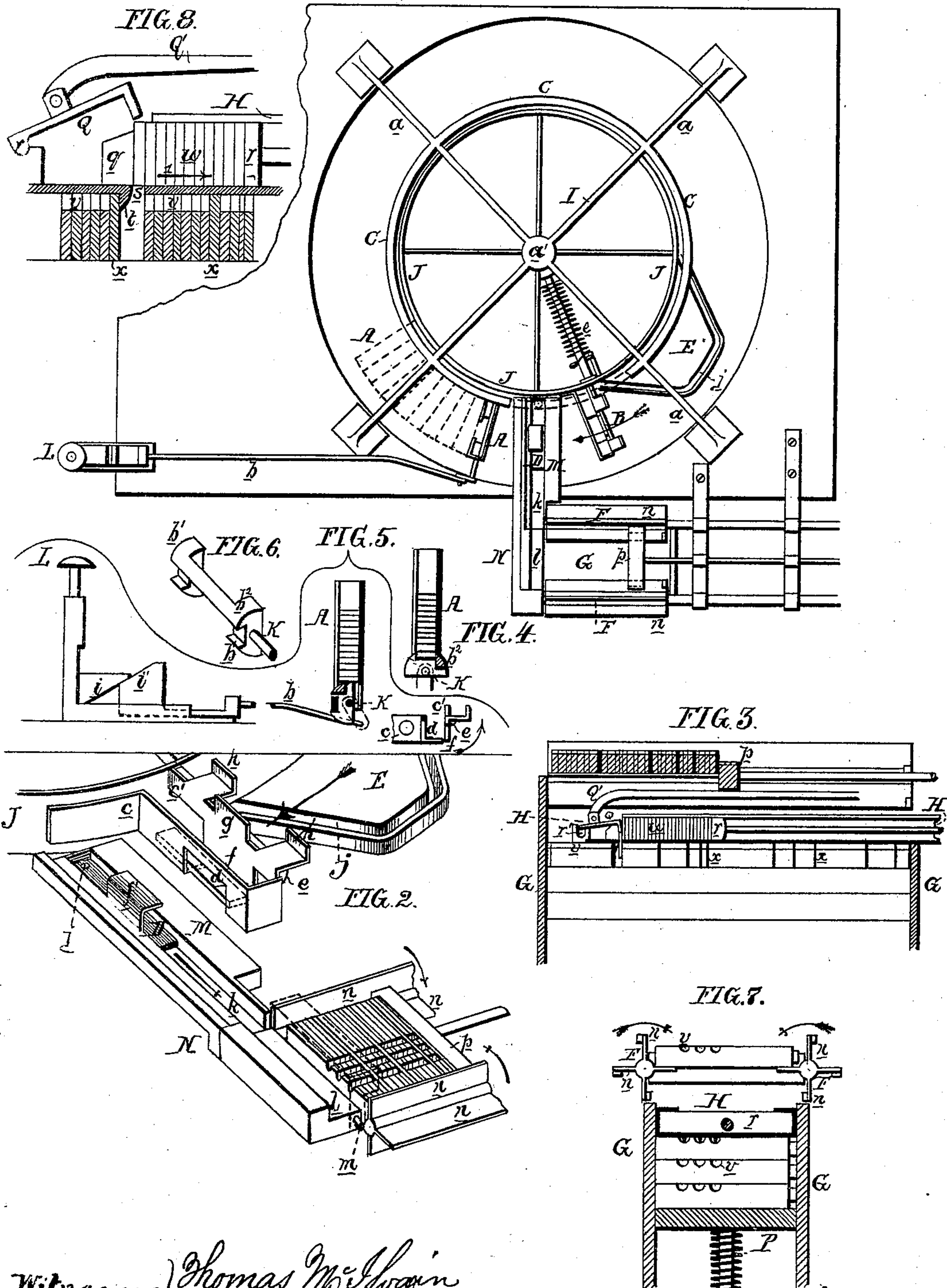


**S. H. ORWIG.**  
**Type Setting Machines.**

No. 138,922.

Patented May 13, 1873.

*FIG. 1.*



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## IMPROVEMENT IN TYPE-SETTING MACHINES.

Specification forming part of Letters Patent No. **138,922**, dated May 13, 1873; application filed January 10, 1873.

*To all whom it may concern:*

Be it known that I, SAMUEL H. ORWIG, of the city and county of Philadelphia, State of Pennsylvania, have invented Improvements in Type-Setting Machines, of which the following is a specification:

The object of my invention is to set type by machinery more rapidly than they can be set by hand, and this object I attain by delivering the type, one at a time, from any of a series of radially-arranged reservoirs, A, (see plan view, Fig. 1, of the accompanying drawing,) into a carrier, B, which travels in a circular path beneath the reservoirs, and discharges its type onto a pusher-bar, D, advanced and retracted by a rotating slotted plate E, and arranged to push the type to a point opposite, or onto, a "stick," consisting of two parallel spindles, F F, having arms which sustain the type, (see perspective view, Fig. 2;) and, when the line is full, it is dropped bodily, by a simultaneous partial revolution of the two spindles, into a galley, G, each line, when thus dropped, and during the setting of another line above it, being "justified" by the apparatus H, illustrated in the sectional view, Fig. 3, which will be fully described hereafter.

The construction and operation of the machine will be fully understood from the following detailed description: The type-reservoirs A are arranged radially, and as closely together as possible, upon a fixed annular bar, C, sustained, in the present instance, at a short distance above the frame I of the machine by arms, *n*, which also support the upper bearing *a'* of a vertical power-driven shaft, carrying a wheel, J, to which the carrier B and slotted plate E, for operating the pusher-bar, are secured. (See Fig. 1.) At the bottom of each reservoir A is a type supporting and delivering spindle, K, of the peculiar shape best observed in the sectional views, Figs. 4 and 5, and perspective views, Fig. 6. This spindle is arranged to be turned to the extent of one-quarter of a revolution by a key, L, and connecting-rod, *b*, of which there is one for each reservoir, and the said spindle is cut away in the center, and has at each end an arm, *b*<sup>1</sup>, which is recessed so as to receive a type from the column, when the spindle is in position, shown in Fig. 4, and to retain the said

type, when the spindle is adjusted to the position shown in Fig. 5, the column of type in the reservoir, when the parts are in this latter position, resting upon the rounded portion *b*<sup>2</sup> of the spindle. The revolving type-carrier B passes directly beneath the type-reservoirs in the direction of the arrow, and its construction is as follows: The front and lower portion *c* of the carrier forms a pocket for the type, and is fixed and slotted at *d*, but the whole rear portion *c'* of the said carrier can be turned, to a limited extent, in the direction of the arrow upon the fulcrum-rod *e*, the latter being provided with a spring which retains the parts in the position shown. The portion *c'* of the carrier has a lower projection, *f*, directly opposite a hooked projection, *f'*, on the fixed portion M of the machine, and the said carrier is also provided with projections *g* and *h* *h'*, the object of which will be hereafter described. The method of delivering the type one at a time from the reservoirs to the carrier, and from the latter to the pusher-bar D, previous to setting up a line, is as follows: The keys L, which control the spindles K of the several reservoirs, are arranged before the operator in a row or rows, and a pressure upon any one of them will have the effect of turning the spindle K of its reservoir from the position shown in Fig. 4 to that illustrated in Fig. 5; or, in other words, to withdraw a type from the reservoir and to lower it into the path of the rotating carrier B. The movement of the key is, in the present instance, transmitted to the spindle through the medium of two inclined planes, *i* and *i'*, (Fig. 5,) secured to the said key and rod *b*, but a bell-crank lever, or other equivalent device, might be substituted for these inclines. The carrier passes beneath the reservoirs in the direction of the arrow, Fig. 1, and any type lowered into its path, as above described, will be struck by the projection *g* of the said carrier, and thus withdrawn from the recessed retaining-arms *b*<sup>1</sup> of the reservoir-spindle, and dropped into the pocket formed in the carrier for its reception. The projection *g* passes between the arms *b*<sup>1</sup>, but the latter are struck by the projections *h* *h'* of the carrier, and are thus, with the spindle, automatically restored to their original positions, Fig. 4, and receive another type from



the column, which will, in like manner, be carried down into the path of the carrier, when the spindle is again turned by means of its key L. It will be observed that when the arms  $b^1$  of the spindle are turned downwards, the column of type is not left unsupported, but is sustained by the rounded portion  $b^2$  of the spindle, the latter passing from beneath the type without effort, when the said arms are again raised. The carrier B, after having received a type, conveys it around to the pusher-bar D, onto which the said type is discharged by means of the fixed projection  $f'$ , Fig. 2, the latter, as the carrier moves over it, passing through the slot  $d$ , and pushing the type laterally out of the pocket, the portion  $c'$  of the carrier yielding to the pressure of the said projection, and turning sufficiently upon its spring-rod  $e$  to permit the discharge of the type which falls onto the pusher-bar D. The carrier B again passes beneath the reservoirs to receive another type, and it is followed by the slotted plate E, before referred to, the double-inclined slot  $j$ , in which receives a pin,  $j'$ , on the under side of the pusher-bar, and suddenly thrusts the latter forward in the direction of the arrow, Fig. 2, through the groove K, and then retracts the same to its original position. This sudden movement of the bar shoots the type onto a ledge,  $l$ , formed on a lever, N, at a point directly opposite the two spindles F, which form the stick. This lever N, which has its fulcrum at  $m$ , Fig. 2, is, after the passage of the slotted plate E and retracting of the pusher-bar, automatically turned to the position indicated by dotted lines, by which movement the type is simultaneously turned over upon its edge and conveyed into the line which is being formed upon the stick. After this movement, the lever N is automatically restored to its original position by means of lugs on the carrier-wheel J, or otherwise. I prefer to use this lever, but it is not absolutely essential in carrying out my invention, as the type, when shot forward by the pusher-bar, could be simultaneously turned over upon its edge and delivered onto the stick by gradually narrowing and inclining one side of the groove K, through which it is caused to slide.

The spindles F F are parallel, and are geared together or otherwise operated, so that when turned intermittently to the extent of one-quarter of a revolution at each movement, their arms  $n$ —of which each spindle has four—may be brought directly opposite each other, and thus form a support for the line of type. A cross-head,  $p$ , sliding upon the horizontal arms of the spindles which form the bottom of the stick, bears constantly against the line of type with a yielding pressure, and thus serves to maintain the said type in close contact with each other. When the line is full, this cross-head is entirely withdrawn from the spindles, and the latter are then simultaneously turned in the direction of their respective arrows, Figs. 2 and 7, to the extent of

one-quarter of a revolution, which will cause the whole line to be dropped bodily into the galley G and upon the line previously set up, the lines of set up matter being retained in the galley by a spring-plunger, P, (Fig. 7), which yields so as to always maintain the uppermost line at the proper determined distance beneath the stick, this distance being just sufficient to permit the introduction, between the said uppermost line and the stick, of the justifying apparatus H, illustrated in Figs. 3, 7, and 8. This consists of a case filled with blank type or spaces  $w$ , which are held constantly against two stop-pieces,  $q$ , at the end of the case, by a spring-plunger,  $r$ . A lever, Q, having its fulcrum at  $r'$  and operated constantly by a rod, Q', strikes the upper edge of the blank  $w$ , adjacent to the stop-pieces  $q$ , and, if there be no obstruction beneath, forces the said blank through an aperture,  $s$ , in the bottom of the case. On the under side of the latter and adjacent to the opening is a projection,  $t$ , beveled on one side, but having an abrupt shoulder on the other. This projection can slide freely in either direction through the nicks  $v$ , which are formed on the edges of ordinary type; but the blanks  $x$ , by which, in setting up the line, the type are spaced, are unprovided with these nicks and consequently obstruct the passage of the justifying apparatus, to which a reciprocating movement over the line is imparted.

In moving the apparatus in the direction of the arrow 1, Fig. 8, the inclined edge of the projection  $t$  will permit the same to ride over the blanks  $x$ ; but in sliding the apparatus in the opposite direction, its movement will be stopped by the abrupt shoulder of the said projection coming in contact with one of the blanks. When this occurs, if the pressure be continued against the blank, the latter, and the portion of the line of type behind it, must yield, thus opening a gap, as in Fig. 8, into which a blank,  $w$ , is thrust by the lever Q. When a blank has been thus inserted, the entire justifying apparatus is moved in the direction of the arrow 1, until another blank,  $x$ , is passed over, and when this occurs the movement of the apparatus is reversed, a gap is again opened, and another blank,  $w$ , is dropped into the line. This is continued until the line has been justified or increased in length to exactly the extent required, when the apparatus is withdrawn, prior to the dropping of the next line, which has been formed upon the stick above during the justifying operation.

In describing the justifying operation, I have referred to but one projection,  $t$ , but there may be as many of the latter as there are nicks  $v$  in the type. In Fig. 7 for instance three are illustrated. Instead of beveling the projections  $t$ , I propose, in some instances, to hinge the same, so that they may yield in one direction, but not in the other.

In carrying out my invention, more than one type-carrier B may be employed in connection with the reservoir A. This will depend upon



the diameter of the wheel and the speed at which it is caused to rotate.

I claim as my invention—

1. The combination of a series of type-holders, holding type lying horizontally and arranged radially, and a rotating carrier or carriers passing beneath the holders, receiving type which descend therefrom, and conveying the same to one point, substantially as specified.

2. A receptacle in which the type is deposited by the carrier, in combination with a pusher-bar, D, operating as set forth.

3. The combination, with the type-reservoir A, of a spindle, K, constructed substantially as described, and operated by means of a key through the medium of the devices described, or any equivalent devices.

4. The combination of the spindle K and its arms  $b^1$  with the projections  $h$   $h'$  of the carrier.

5. The combination of the spindle K, and its type holding arms  $b^1$  with the projection  $g$  of the carrier.

6. The carrier B, constructed substantially as described, with a fixed portion,  $c$ , pivoted portion  $c'$ , and pocket for the reception and retention of the type.

7. The combination, substantially as described, of the stationary projection  $f'$  with the fixed and pivoted portions of the carrier B.

8. The combination of the rotating slotted plate E with the pusher-bar D, substantially as specified.

9. The combination, substantially as de-

scribed, of the receptacle in which type is deposited by the carrier, the pusher-bar D, the tilting lever N, and the stick.

10. A stick for type-setting machines, consisting of two parallel spindles, F, having arms for the support of the type, and from which the latter can be discharged into a receptacle beneath, by a simultaneous movement of the two spindles, all substantially as specified.

11. The combination with the type-supporting spindles F of a cross-head acted on by a spring or otherwise, and maintained in contact with the type.

12. The combination with the stick and galley of a justifying apparatus operating in the space beneath the stick and above the lines of type in the galley.

13. The intermittently-moving case H, with its projection or projections  $t$ , adapted to the nicks  $v$  of a line of type, but arranged when moved in one direction to strike the blanks  $x$ , between the said type, and to thus separate the latter, for the purpose specified.

14. The combination, substantially as described, of the case H, its lever Q, the stops  $q$ , aperture  $s$ , and line of blanks  $w$ , maintained in contact with the said stops  $q$ , by a spring plunger  $r$ , or equivalent device.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

SAM. H. ORWIG.

Witnesses:

WM. A. STEEL,

JOHN K. RUPERTUS.