No. 702,781. Patented June 17, 1902.

P. T. DODGE.

LINOTYPE MACHINE.

(Application filed Feb. 11, 1902.)

(No Model.)

Fig. 1.

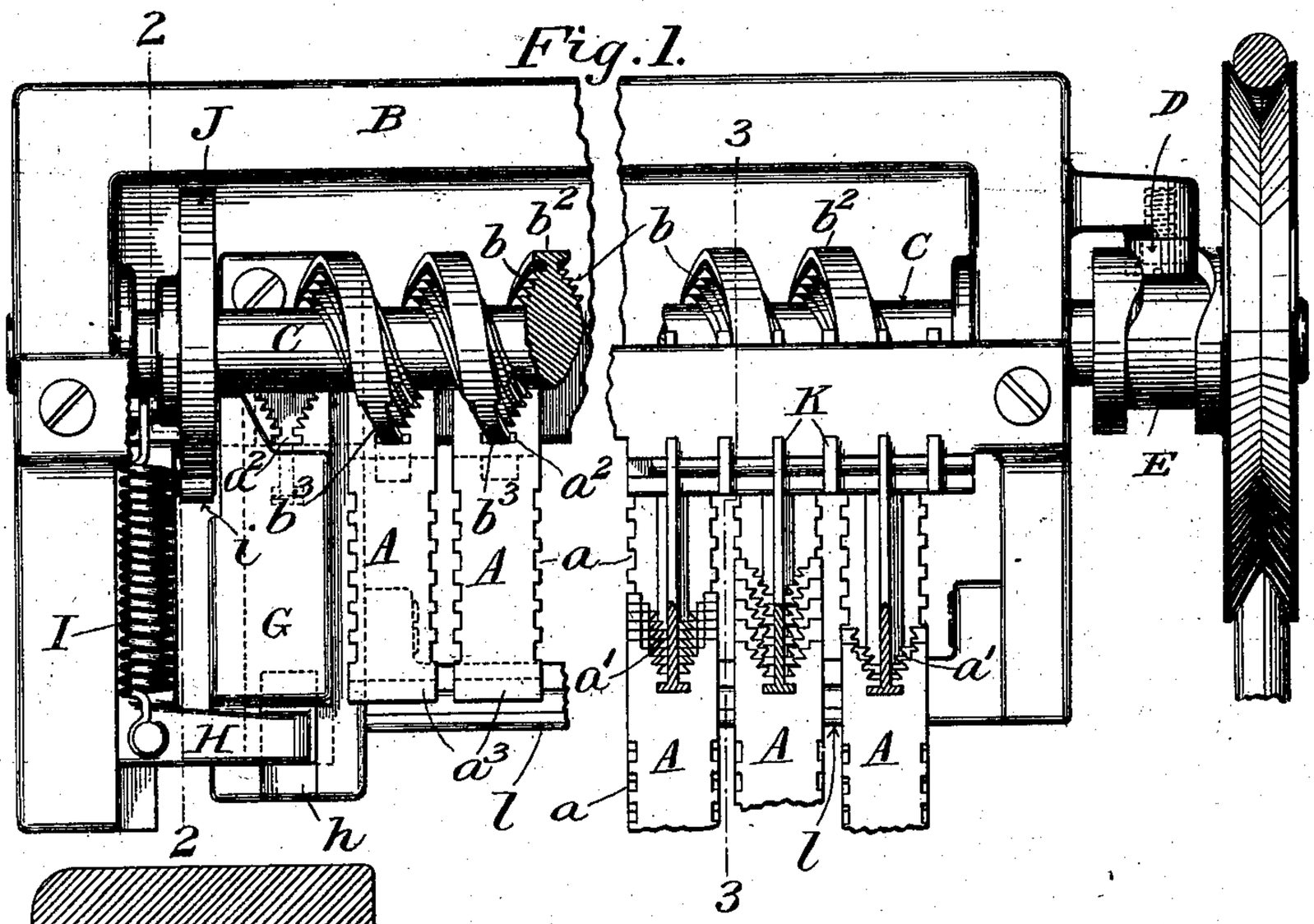


Fig. 2.

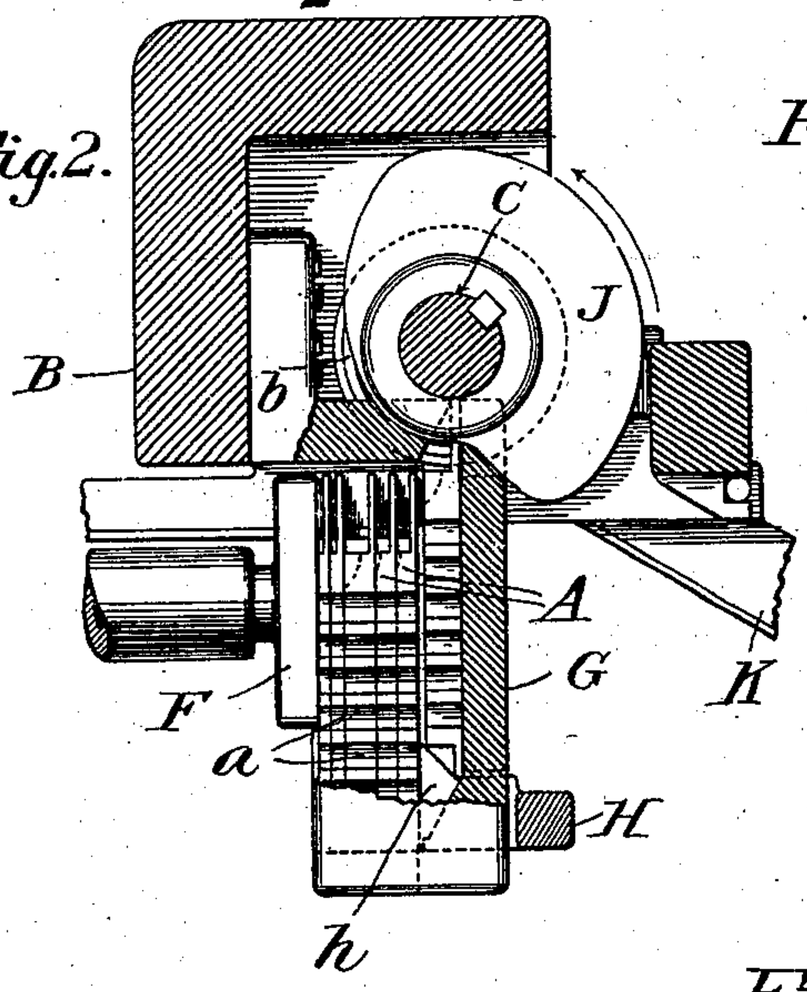


Fig. 3.

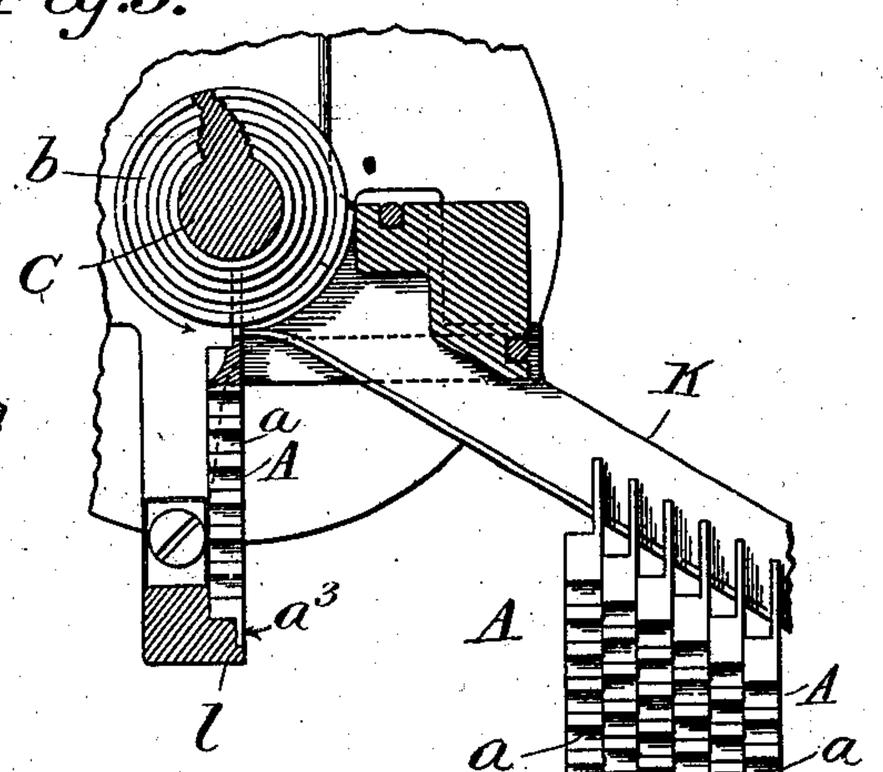
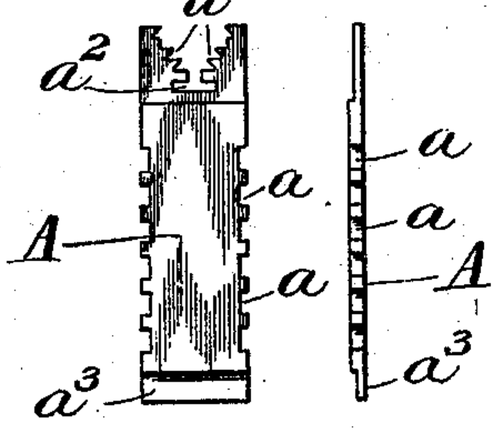


Fig. 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

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LINOTYPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 702,781, dated June 17, 1902.

Application filed February 11, 1902. Serial No. 93,494. (No model.)

To all whom it may concern:

Be it known that I, PHILIP T. DODGE, of Washington, District of Columbia, have invented a new and useful Improvement in Linotype-Machines, of which the following is a specification.

At the present day there are in use machines in which a series of metal matrices containing intaglio characters are temporarily assembled or composed in line with suitable spaces for presentation to the face of a mold in order to form on the edge of a type-metal slug cast in said mold raised type characters in the order in which they are to appear in print.

The present invention relates to a distributing mechanism for separating the matrices from the composed lines and returning them to their appropriate groups in the magazine or holder, from which they are to be again delivered in the designated order.

As all the other parts of the machine may be of any appropriate construction and are foreign to my invention, I have restricted the drawings to an illustration of my improved distributing devices.

The essence of my invention resides in a horizontal screw having on the sides of its thread and following the line of the same series of teeth varying in number and arrangement at different points in the length of the screw, whereby the screw is adapted to sustain and carry the matrices, which have their upper ends notched or toothed to straddle and embrace the thread, the teeth of the matrices bearing the different characters being varied with regard to each other and to the teeth of the screw in such manner that each matrix received at the end of the screw will be carried along thereunder and pendent therefrom until it arrives opposite it proposed place in the magazine, whereupon its teeth will be disengaged by those of the screw and it will be left free to pass into the magazine.

The invention further consists in combining with the screw a cam or equivalent device for imparting a longitudinal motion thereto during each revolution when it is in position to release the matrices, this motion being in opposition to the trend of the thread, so as to neutralize the tendency of the screw to continue the advance of the matrices, and thus give an increased time for their delivery to the magazine, and this to the end that their delivery may be insured and that there may be no binding of the parts.

Referring to the accompanying drawings, Figure 1 represents a side elevation of my composing mechanism; Fig. 2, a cross-section on the line 2 2 of Fig. 1; Fig. 3, a cross-section on the line 3 3 of Fig. 1. Fig. 4 represents a side view and an edge view of one of the matrices.

Referring to the drawings, A A represent the matrices for the distribution of which my mechanism is constructed. These matrices, which vary in thickness according to the width and size of the characters to be produced, consist in the form shown each of an elongated rectangular plate of brass or equivalent material having in one edge a series of intaglio characters or matrices proper, a. In the upper end, which is reduced in thickness, each matrix has a central V-shaped notch provided with a series of selecting or distributing teeth a' in the two edges and with a widened portion a^2 below the teeth. At the lower end the matrices are preferably cut away or reduced in thickness to leave a thin portion a^3, which will be of equal thickness in all the matrices regardless of the thickness of their bodies.

Referring now to the distributing mechanism, B represents a stationary frame, and C a horizontal screw mounted in this frame and adapted to rotate and also to move longitudinally to a limited extent, as hereinafter explained. The thread of the screw is of V form in cross-section, or, in other words, of diminished thickness toward the periphery, and is provided on each of its side faces with a series of teeth b, extending in parallel lines concentric with the screw. These teeth are made of size and form corresponding to the toothed notches in the upper end of the matrices, so that when the screw is revolved and the upper end of the matrix passed upon the end of its thread the teeth of the matrix will engage those of the thread, and as the rotation of the screw continues the matrices will remain suspended thereunder and be carried in the direction of its length. The distrib-

uting-teeth of the screw are not continuous. They vary in number or relative arrangement, or both, as between each turn of the screw and the next, or, in other words, the arrangement is permuted after the manner fully explained in Letters Patent to Ottmar Mergenthaler, No. 347,629. The teeth of the various matrices are correspondingly arranged or permuted, so that each matrix traveling along a screw and in engagement with its thread will be held and carried by the screw until it reaches the position at which it is to enter the magazine. At this particular point, and not before, all of the teeth of the screw will cease to engage the teeth of the matrix, which will be free to escape. In order to insure the delivery of the matrices at the proper time, I widen the outer edge of the screw-thread, as shown at b^2. This widened portion is adapted to enter the widened slot a^2 in the matrices, so that during the engagement of a matrix with this widened edge it serves to positively prevent the release of the matrix and also to sustain the whole or a part of its weight in order to prevent excessive wear of the matrix-teeth by the teeth of the screw. In each turn of the screw the widened edge b^2 is cut away or reduced in width for a short distance, as shown at b^3, so that when this reduced portion of the thread is on the under side of the screw the matrix fails to receive support in its notch a^2 and is therefore free to escape from the screw if at its proper point of delivery, or, in other words, if it is at a point at which the distributing-teeth b also release it.

From the foregoing it will be seen that each matrix receives support during its travel to the point of delivery from the distributing-teeth b and also during a portion of the time from the widened edge or flange b^2 and also that when each matrix has reached the proper point of delivery it is released from the distributing-teeth b and from the flange b^2.

When the machine is driven at ordinary speeds, the matrices may be delivered in a satisfactory manner by the devices above described and without imparting any longitudinal motion to the screw. If, however, the machine is driven at a very high speed, so that the matrices are advanced rapidly, it is advisable to increase the time allowed for them to disengage and escape from the screw, and this I do by imparting to the screw a longitudinal movement in a backward direction—that is to say, in a direction opposite to that in which the threads advance. The effect of this is to neutralize for the moment the tendency of the screw to carry the matrices forward, so that although the screw continues its rotation the matrix ceases its advance. In this way the time allowed for the disengagement and fall of the matrix is increased and made equal to the time required for the passage of the reduced portion of the thread b^3 or for the passage of that particular section of the teeth from which the matrix is disengaged.

Any suitable means may be employed for moving the screw endwise. A simple arrangement, as shown in Fig. 1, consists of a fixed arm or roller D, extending into a cam-groove in a hub E on the driving-pulley fixed to the screw. For a portion of its length this groove lies in a plane at right angles to the axis of the screw; but for the remainder of its length it is deflected laterally, as shown in the drawings, so that during the action of this deflected portion the screw is pushed to the left at the same rate of speed that the threads tend to move the matrices to the right.

I have shown in the drawings a mechanism for delivering the matrices to the screw, consisting of a pusher or follower F, acting horizontally to advance the assembled matrices toward a vertical stationary stop-plate G. A vertically-reciprocating slide H, having a beveled tooth h, rises beneath the foremost matrix and lifts it above its companions and until its upper end is in position to straddle and engage the end of the screw-thread. The action of this slide at the proper time to present the matrix immediately in front of the under thread is secured by a spring I, which tends to lift the slide, and by a depressing-cam J, secured to the end of the screw and acting on a roller i on the side of the slide. This cam is formed and timed with reference to the other parts, as indicated in the drawings, so that the matrices are presented successively to the screw, one at each turn of the latter. The space behind the plate G occupied by the foremost matrix is unobstructed opposite the edge of the matrix, so that after being carried sidewise beneath the screw and then lifted endwise into engagement therewith the matrix may be carried edgewise from under the plate G in order to make room for the succeeding matrix.

The magazine shown herein consists simply of a series of parallel inclined rails K, flanged at their lower edges to enter the upper ends of the matrices and give them support as they slide downward by gravity thereon. The upper ends of these rails, as shown in the drawings, are presented in such position that each matrix when released by the screw will stand directly opposite one of the rails and in position to tip forward thereon. To prevent the matrices from falling, I provide a horizontal rail or support l, which stands directly beneath the lower end of the row of matrices, as plainly shown in Fig. 3.

The essence of my invention resides in the employment of a carrying-screw the thread of which is longitudinally toothed to engage the matrices and prevent them from escaping until they have reached their respective positions.

Having thus described my invention, what I claim is—

1. In a distributing mechanism, a carrier-

screw, having its threads provided with longitudinal distributing-teeth, varied in arrangement at different points in the length of the screw, substantially as described and shown.

2. In a distributing mechanism, a matrix-carrying distributing-screw, having its threads tapered in cross-section and provided on their two sides with distributing-teeth following the course of the thread and varied in arrangement at different points in their length, whereby they are adapted to deliver differing matrices at different points.

3. In a distributing mechanism, a distributer-screw having a thread of varying cross-section at different points in its length, in combination with a series of matrices having their upper ends notched in varying forms to engage the thread of the screw, whereby the screw is adapted to carry said matrices in succession and to deliver them at different points.

4. In a distributing mechanism, a carrier-screw having a thread of tapering section, with permuted distributing-teeth on its sides, and with a widened outer edge b^2 reduced in width at intervals, as described.

5. In a distributing mechanism, a screw having a toothed matrix-carrying thread, the teeth on each turn differing from those on the next, substantially as described and shown.

6. In a distributing mechanism, a carrying-screw, having its thread provided with permuted teeth, substantially as described, in combination with means for reciprocating the screw in an axial direction.

7. In combination with a screw having permuted distributing-teeth on the sides of its thread, means for moving the screw endwise in opposition to the trend of the screw when the screw is in position to release the matrices, whereby the tendency of the screw to advance the matrices is neutralized and longer time afforded for the delivery of the matrices.

8. In combination with a distributer having a rotary toothed screw, substantially as described, a cam applied thereto, and a co-operating device, whereby the cam is caused to shift the screw endwise.

9. The supporting-frame, the distributing-screw having a toothed thread, mounted to rotate and reciprocate in said frame, the grooved cam on said screw, and the fixed device engaging said cam, whereby end motion of the screw is effected during its rotation.

10. In a distributing mechanism, the combination of a carrying-screw having its thread provided with distributing-teeth, and the magazine-rails K, having their upper ends arranged in position to receive the matrices as they are released from the screw.

11. In a distributing mechanism, a screw having its thread provided with distributing-teeth, in combination with mechanism substantially as shown for presenting the matrices successively with their toothed ends in position to engage the screw-thread.

12. The carrying-screw provided with distributer-teeth, in combination with a pusher device F for advancing the line of matrices beneath the screw, and a lifting device H, presenting the matrices successively in position to engage the screw.

13. In combination with a screw provided with distributing-teeth, a matrix-stop G, a feed device F, and a lifting device H, substantially as shown.

14. In combination with the toothed distributer-screw C and its cam J, the matrix-feeding slide H, subject to the depressing influence of the cam, and a spring I acting in opposition to the cam to lift the slide.

15. In combination with the toothed distributer-screw, an underlying matrix-support L and magazine-rails K, terminating below the screw and above the support, substantially as shown.

16. In combination with the toothed distributer-screw and a feed-slide H, a series of matrices having their upper ends reduced in thickness and provided with teeth, substantially as shown.

In testimony whereof I hereunto set my hand, this 5th day of February, 1902, in the presence of two attesting witnesses.

PHILIP T. DODGE.

Witnesses:
JOHN F. GEORGE,
M. A. DRIFFILL.