

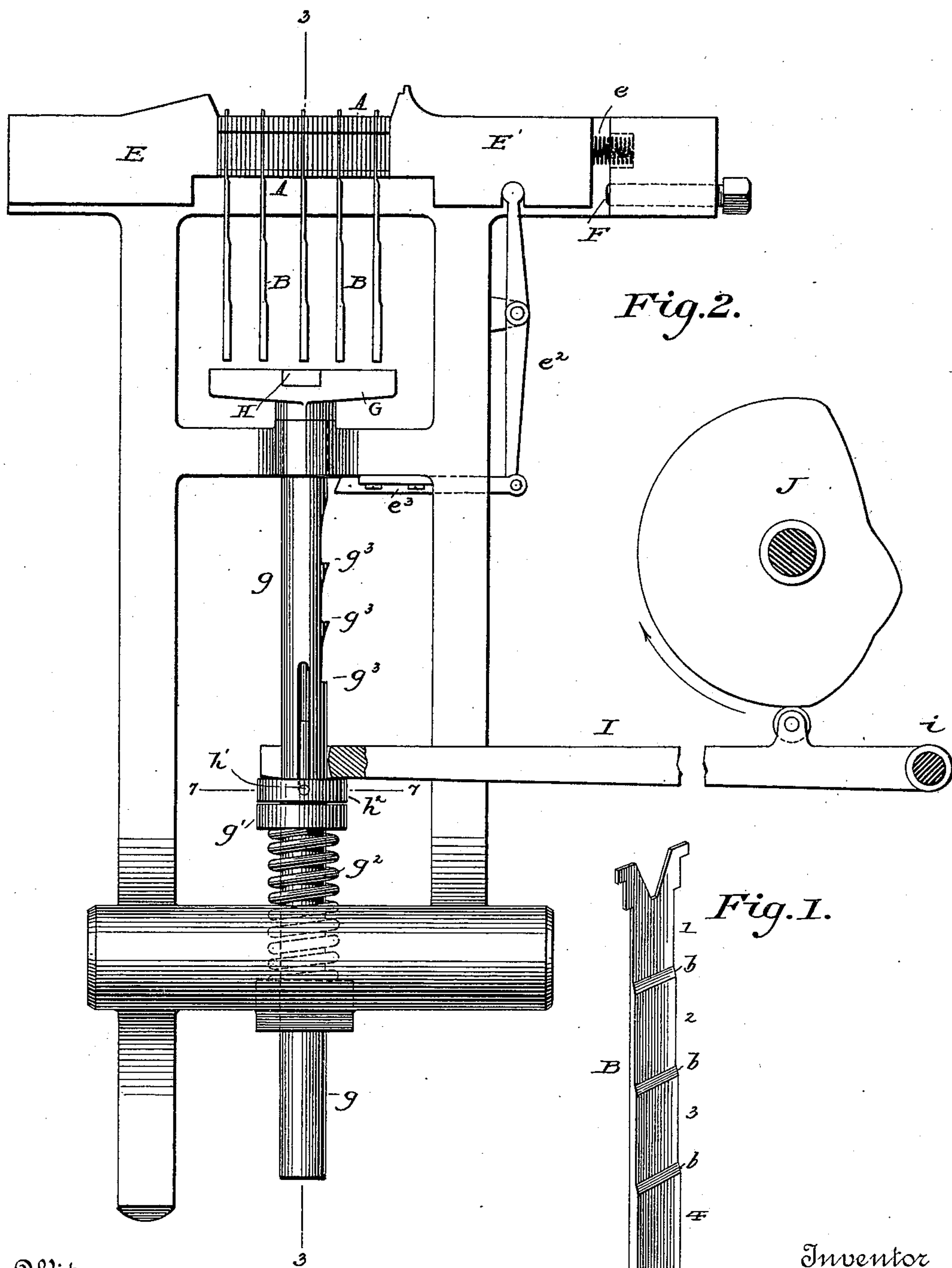
(No Model.)

2 Sheets—Sheet 1.

P. T. DODGE.
LINOTYPE MACHINE.

No. 565,440.

Patented Aug. 11, 1896.



Witnesses
Raymond H. Barnes.
A. R. Kennedy.

Inventor
P. T. Dodge

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

on line 3-3.

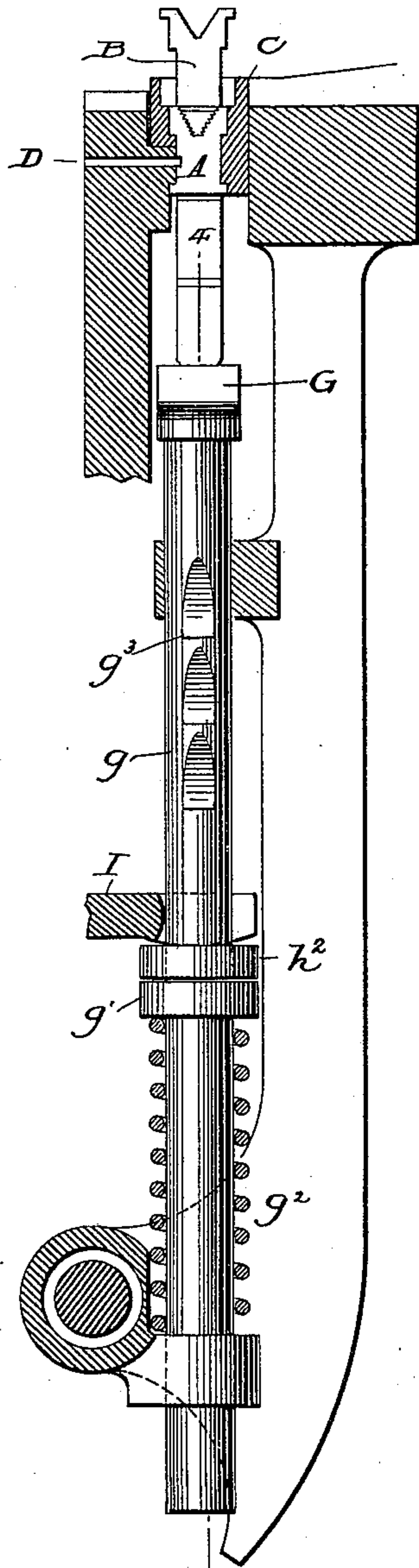


Fig. 5.

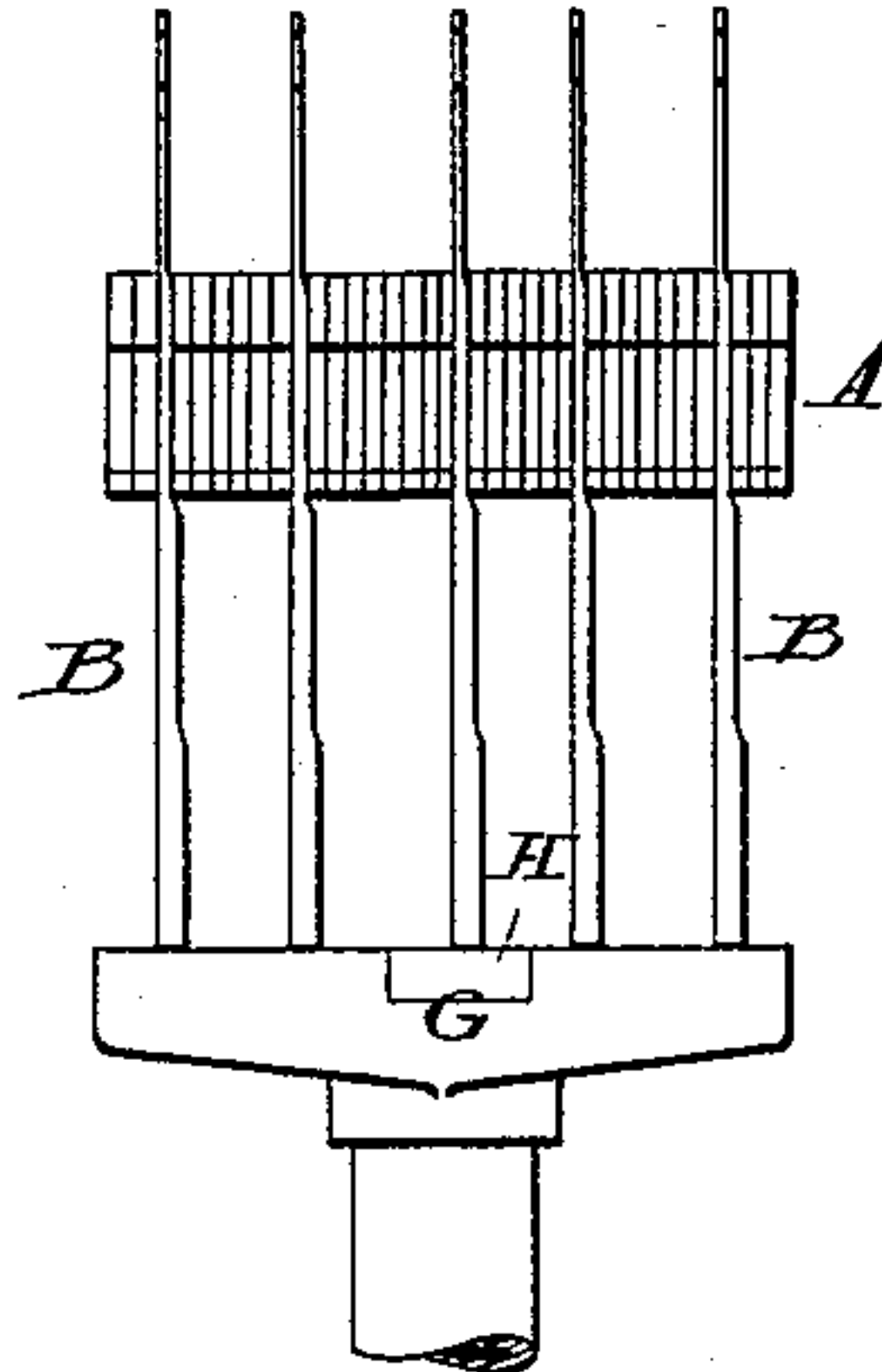


Fig. 6.

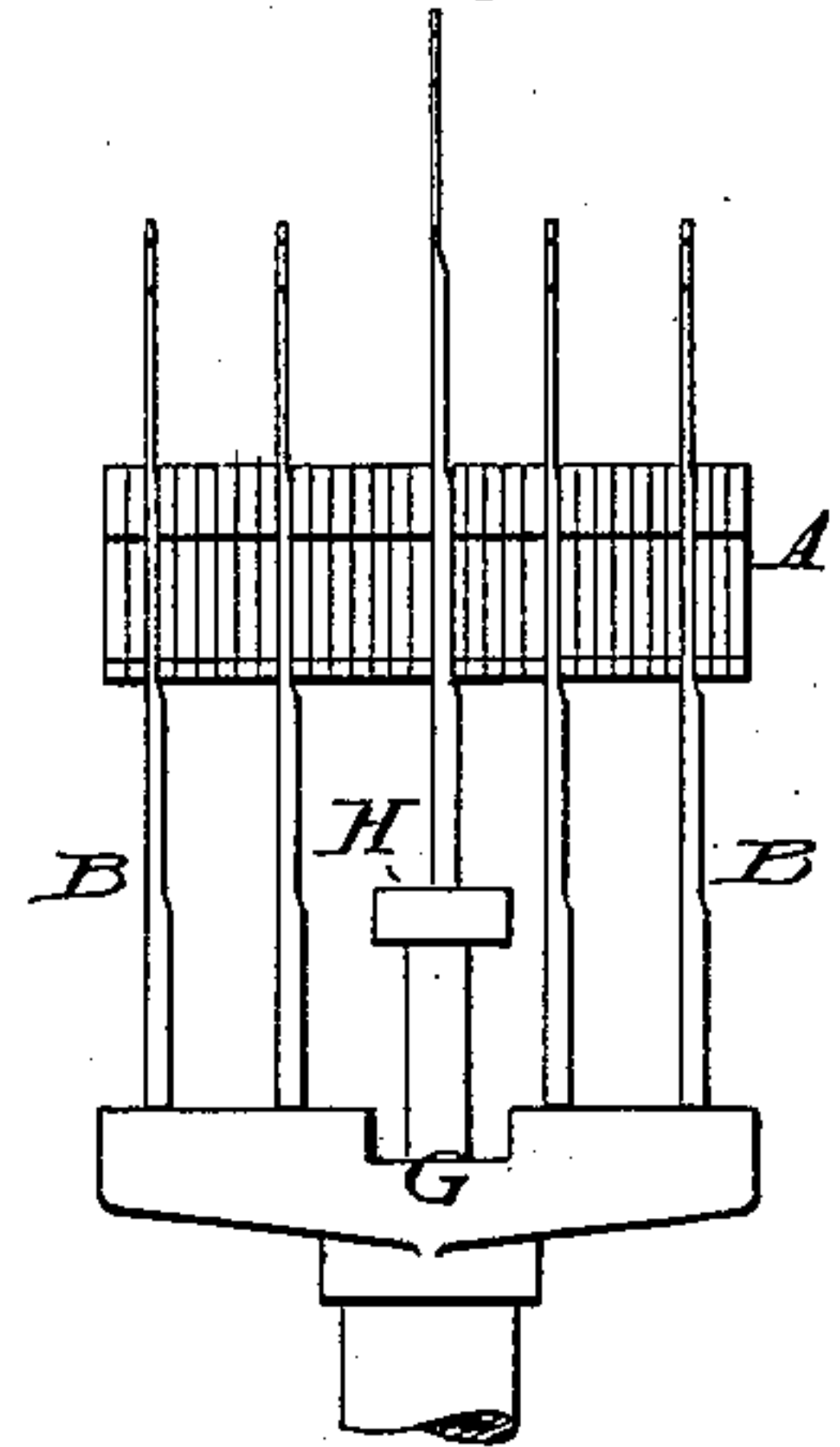


Fig. 7.

on line 7-7.

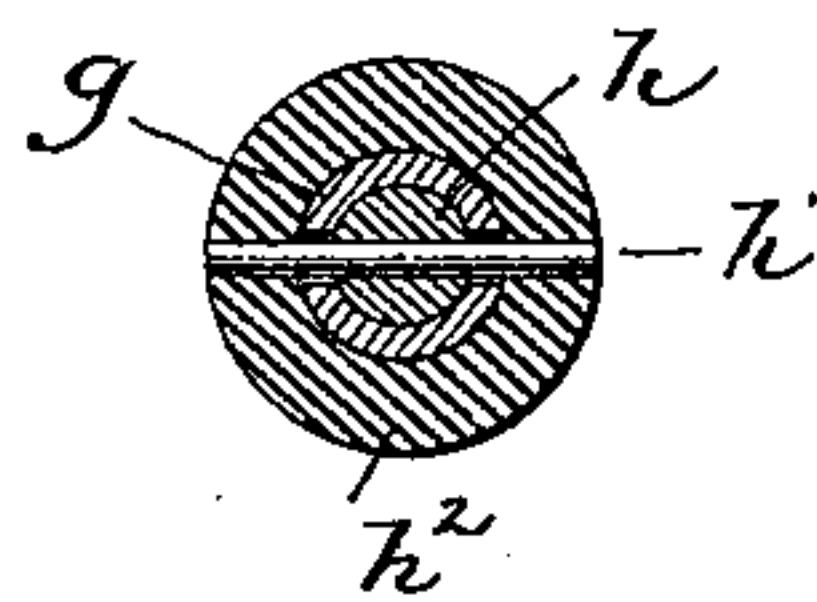
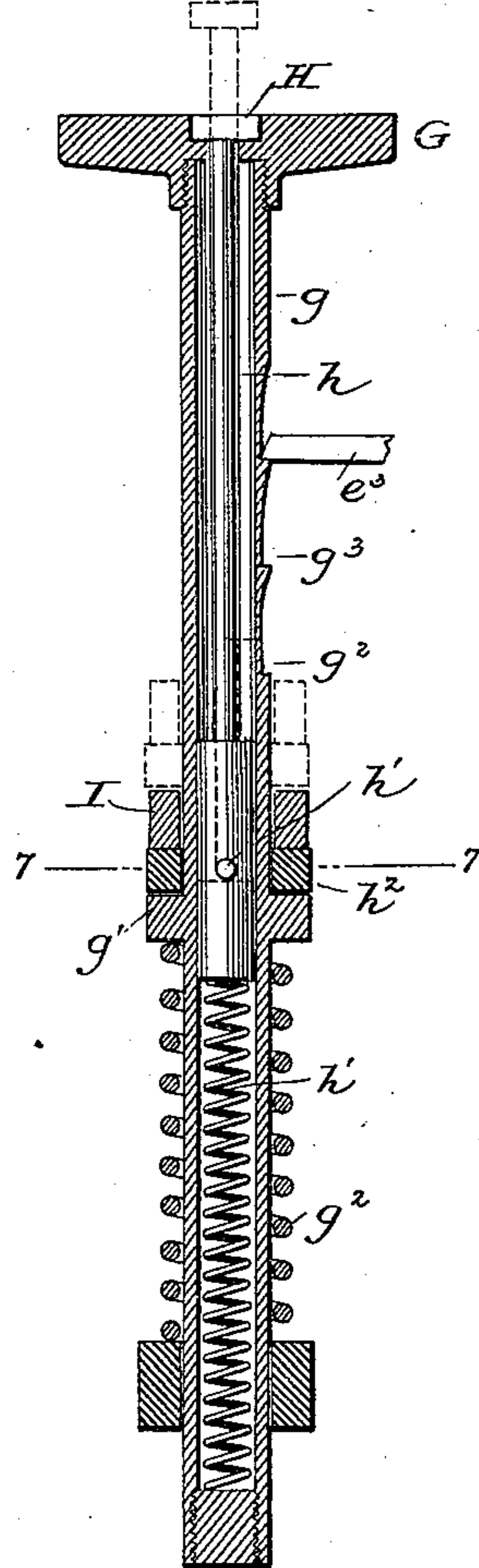


Fig. 4.

on line 4-4.



Witnesses

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UNITED STATES PATENT OFFICE.

PHILIP T. DODGE, OF WASHINGTON, DISTRICT OF COLUMBIA.

LINOTYPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 565,440, dated August 11, 1896.

Application filed September 1, 1893. Serial No. 484,533. (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.

This invention has reference to means for automatically justifying or spacing out to a predetermined length composed lines of type-matrices or type-dies, and is intended for use not only in the Mergenthaler linotype-machine, but generally in all machines in which composed lines of type or dies are required to be justified. In effecting this justification I introduce into the line at required points the thin ends of elongated spaces, which increase in thickness step by step from one end toward the other. As the space remaining to be filled in different lines and the number of spaces in the line vary, it is manifestly impossible to effect perfect justification by advancing all the spaces equally through the line. I therefore provide for advancing the spaces in series through the line, so that they will present an increasing thickness therein until it has reached the required length, or nearly so, when their advance is automatically stopped. I provide for thereafter advancing one or more of the spaces, less in number than the whole number first advanced, a farther distance through the line, in order that they may introduce therein a slight additional space necessary to complete the justification. In this manner I am enabled to add to the line at the completion of the action a space less than that which would be added by advancing all of the spaces one step.

I have represented my invention in a form adapted for application to the Mergenthaler linotype-machine, such as represented in Letters Patent of the United States dated September 16, 1890, No. 436,532, and with the exception of the parts herein substantially described the machine may be in all respects like that represented in Letters Patent above named.

Figure 1 is a perspective view of one of the wedges such as I employ. Fig. 2 is an elevation of the line of matrices and spaces, together with the justifying devices cooperating therewith. Fig. 3 is a transverse sec-

tion on the line 3 3 of the preceding figure, the parts being, however, shown in the positions they occupy after the first step in the justification. Fig. 4 is a transverse vertical section on the line 4 4 of Fig. 3. Figs. 5 and 6 are diagrams illustrating the different positions of the parts during the course of justification. Fig. 7 is a cross-section on the line 7 7 of Figs. 2 and 4.

A A represent a series of matrices arranged in line side by side, and B B the stepped spaces inserted in the line between the matrices during the course of composition.

The matrices are suspended by the shoulders on their upper ends within a carrying yoke or elevator C, the characters or matrices proper being presented across and against the face of a mold D, in which a slug or linotype is cast against the matrices and spaces, as usual. The spaces are also provided with sustaining-shoulders at their upper ends, with which they are maintained in position in the line until justification occurs.

Each space consists, as shown in Fig. 1, of a metal bar or plate increasing in thickness from one end toward the other step by step, so that it presents at different points in its length the several steps or sections 1 2 3, &c., each of greater thickness than the one before. The surface of a space rises gradually from one step to the next, the intervening inclined shoulder *b* serving to crowd the adjacent matrices apart as the space is advanced upward through the line, in order to afford room for the admission of the thicker steps. When the line of matrices and spaces is in operative position, it stands between two jaws or abutments E and E', which serve to limit its length. The jaw E is preferably fixed or adjusted permanently in position, while the jaw E', free to slide horizontally, is pressed inward by a spring *e*, so that the distance between the jaws is normally less than the length of the required line. A stop F of the form shown or any other equivalent form serves, however, to limit the backward motion of the jaw E', so that when stopped the distance between the two jaws will correspond with that of the line demanded.

G is a lifting-bar or pusher located beneath the lower ends of the spaces and carried by a vertically-sliding tubular guide *g*, mounted

in the main frame or otherwise guided. This tubular guide is provided with a collar g' and urged upward by a strong spiral spring g^2 acting thereunder, so that when the parts are released the spring will cause the pusher G to force all of the spaces upward through the line, thereby effecting its elongation.

The guide-rod G is provided with a series of ratchet-teeth g^3 , and the sliding jaw E' is connected through an intermediate lever e^2 with a sliding catch or stop e^3 , mounted in the main frame and arranged to engage the teeth of the guide. As the pusher rises, forcing the spaces upward through the line, the elongation of the latter forces the jaw E' backward, and the jaw in turn through the lever e^2 causes the stop e^3 to engage the teeth of the guide and prevent further rise of the pusher. The parts are so proportioned that this stoppage of the pusher occurs whenever the line has acquired such length that the space remaining to be filled is insufficient to permit the further advance of all the spaces. The teeth are arranged in such position that the spaces are always stopped with their shoulders or inclines b slightly below the matrix-line in order that the matrices may close tightly against the flat parallel surface of those steps which chance to stand in the line. It permits the line to be closed tightly together in front of the mold.

It may happen that the spaces when lifted by the pusher G will fill out the line to the length required. Ordinarily, however, there will be a remaining space to fill, in order to effect the advance of one or more spaces. For this purpose I mount within the pusher G a secondary pusher H, having a stem or shank h , which is extended downward into the tubular guide g and seated on a spiral spring h' , which serves, when the pusher H is released, to carry the same upward above the main pusher in order to advance one or more spaces in the middle of the line above the remaining spaces until the line is filled out to the proper length.

The shank h of the secondary pusher is connected by a transverse pin h' to a collar h^2 , encircling the guide g . A lever I, mounted on a fixed fulcrum i at one end, is forked at the opposite end and arranged to bear on the top of the secondary collar h^2 . A cam J, mounted on a suitably-driven shaft, acts on the roller of lever I to force the same downward. As the cam revolves, the lever I first depresses the collar h^2 until the pusher H stands within and flush with the top of the main pusher G, after which the continued descent of the lever I causes the guide g and the pusher G to descend to their normal positions. (Shown in Fig. 2.) As the cam revolves, it allows the lever I to rise, and the lever in turn permits the main pusher G to rise under the influence of the stronger spring g^2 . When the further ascent of the pusher G is prevented by the stop e^3 , the lever I still continues its ascent, and as the collar h^2 is

relieved from pressure the weaker spring h' lifts the secondary pusher, as shown in Fig. 6, above the main pusher until justification is completed.

The distinctive feature of my invention is the advancement simultaneously of the series of spaces through the line, and the subsequent advancement of some of the spaces, less in number than the whole number first advanced, automatically and positively, by means substantially as described, controlled in its action by the elongation of the line undergoing justification.

Having thus described my invention, what I claim is—

1. In a justifying mechanism a line of matrices, a series of tapering spaces therein, means to advance the spaces simultaneously through the line, and a stop device for the space-advancing mechanism controlled by the increasing length of the line.

2. In a justifying mechanism the combination of a line of matrices and adjustable spaces therein, with space-adjusting mechanism acting to advance a plurality of spaces at one time, a stop for the space-adjusting mechanism, and stop-controlling devices acted upon by the end of the lengthening line.

3. In combination with a line of matrices and stepped spaces therein the main pusher to advance all the spaces positively, and a secondary pusher to further positively advance one or more spaces less in number than the whole number first advanced.

4. In a justifying mechanism and in combination with a line of matrices and stepped spaces therein, two jaws movable one in relation to the other, the pusher acting directly on the spaces, and the stop device positively moved by the jaw and acting to positively arrest the pusher.

5. In combination with the line of matrices and the stepped spaces therein, the two separable jaws, the main pusher, its stop connected with the movable jaw, the secondary pusher, and means for advancing the same after the stoppage of the main pusher.

6. In a justifying mechanism the combination of a pusher device acting directly on all of the spaces to advance them through the line, and a secondary pusher carried thereby, and acting thereafter to advance a part of the spaces beyond the others.

7. In combination with the matrices and spaces the main pusher, the spring and cam to actuate the same, the pusher-stop, and means for controlling the same by the elongation of the line, the secondary pusher, its advancing-spring, and means to prevent its advance until the main pusher is stopped.

In testimony whereof I hereunto set my hand, this 10th day of August, 1893, in the presence of two attesting witnesses.

PHILIP T. DODGE.

Witnesses:

THEODORE BAUMEISTER,
S. CRUTCHFIELD.