(No Model.) 6 Sheets—Sheet 1.

O. MERGENTHALER.

LINOTYPE MACHINE.

No. 557,000. Patented Mar. 24, 1896.

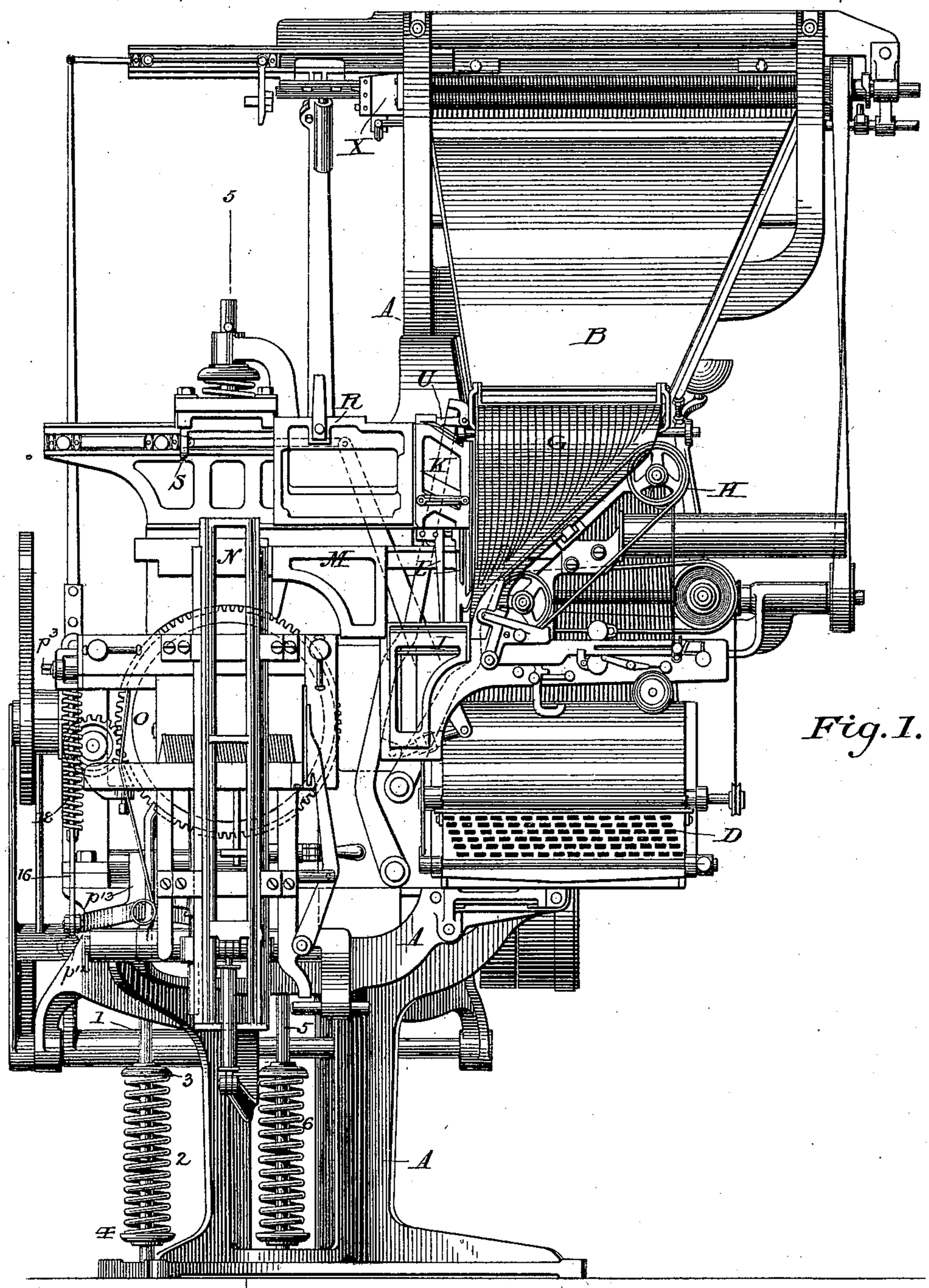

Fig. 1.

Witnesses
Raymond F. Barnes.
Fabius S. Elmore.

Inventor
Ottmar Mergenthaler
By Alex F. Dodge
Attorney

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O. MERGENTHALER.

LINOTYPE MACHINE.

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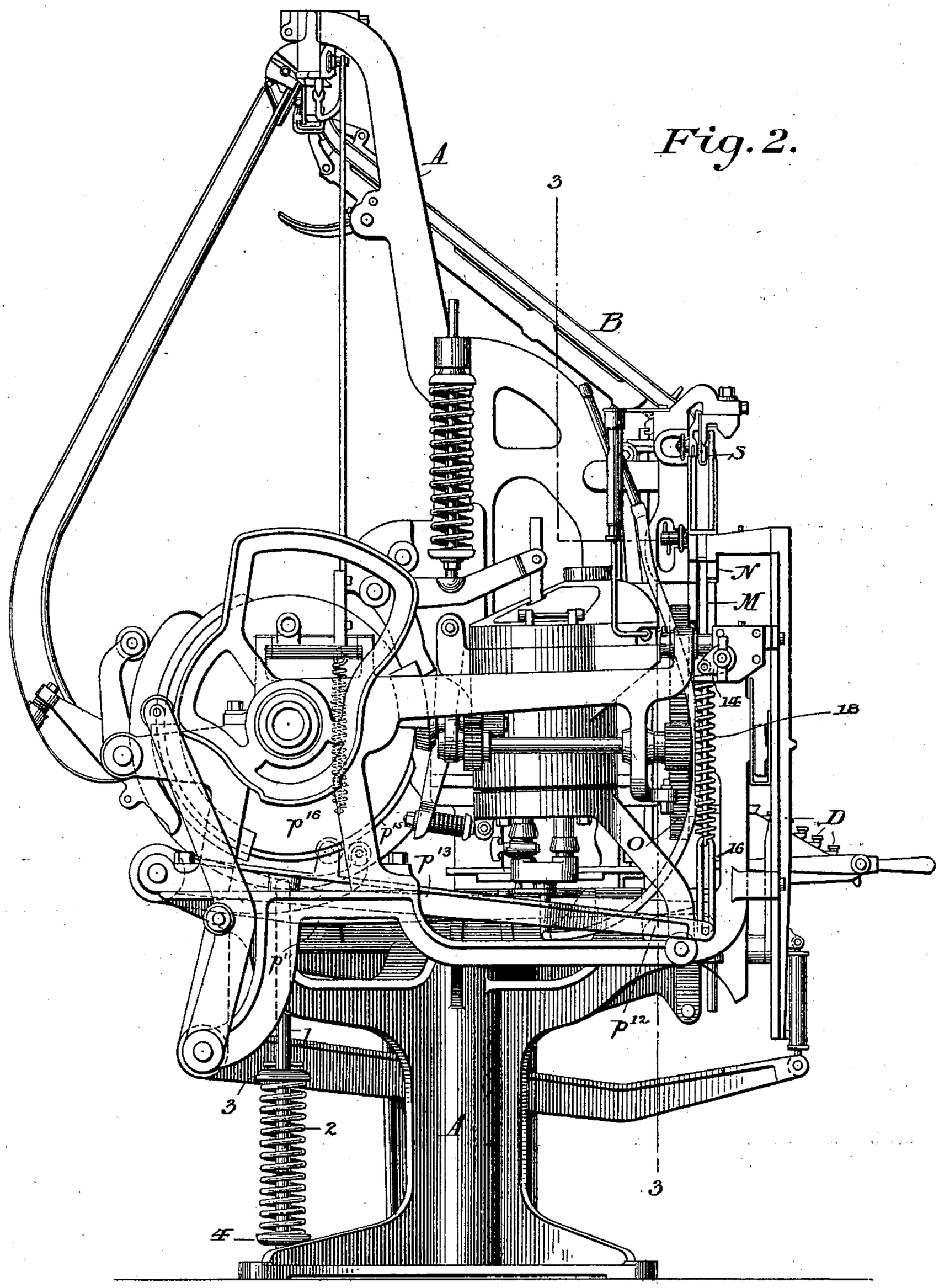
Fig. 2.



Witnesses
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(No Model.)

6 Sheets—Sheet 3.

O. MERGENTHALER.

LINOTYPE MACHINE.

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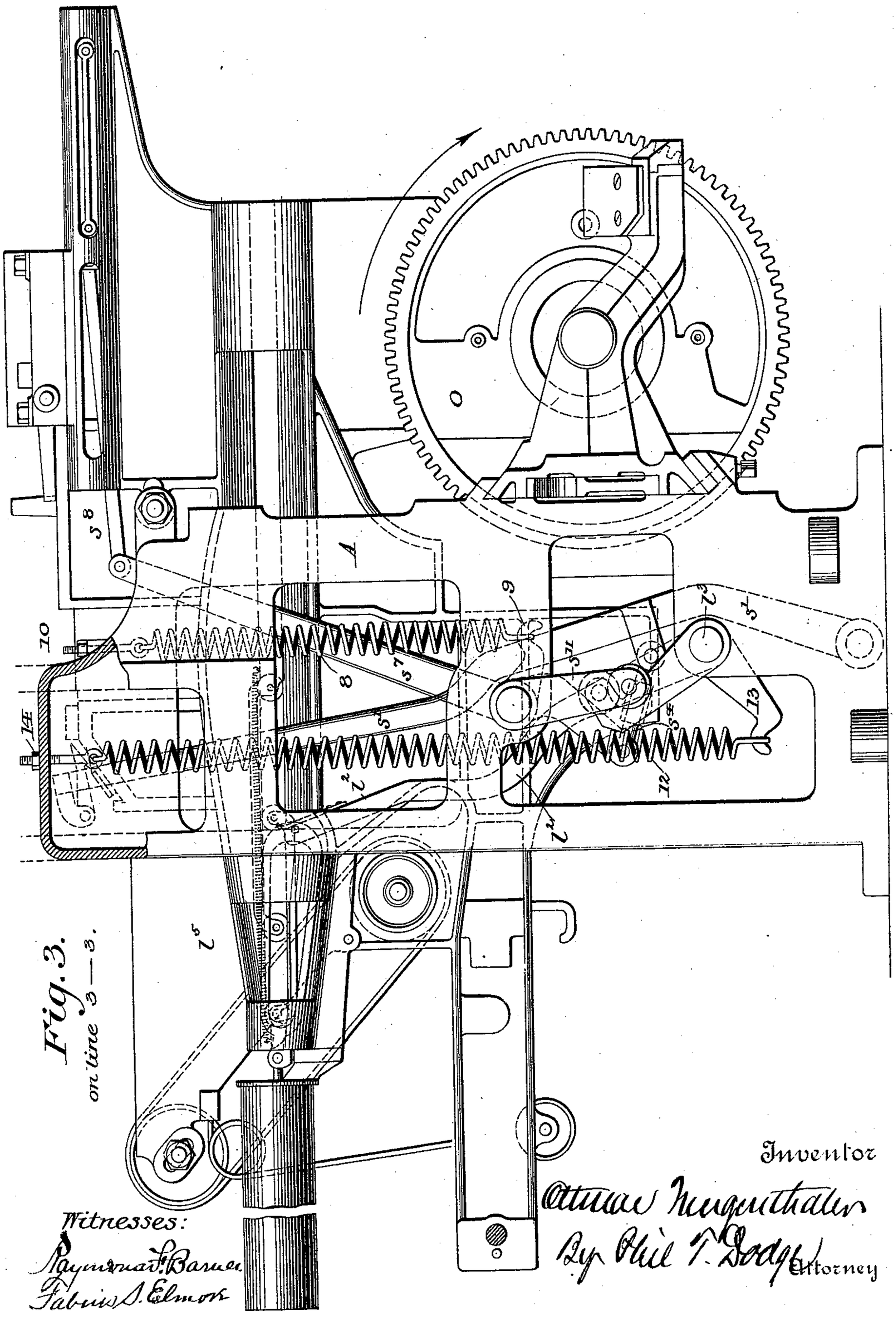

Fig. 3.

Witnesses:

Raymond L. Barnes

Fabius S. Elmore

Inventor

Otmar Mergenthaler

By Phil T. Dodge Attorney

(No Model.) 6 Sheets—Sheet 4.

O. MERGENTHALER.

LINOTYPE MACHINE.

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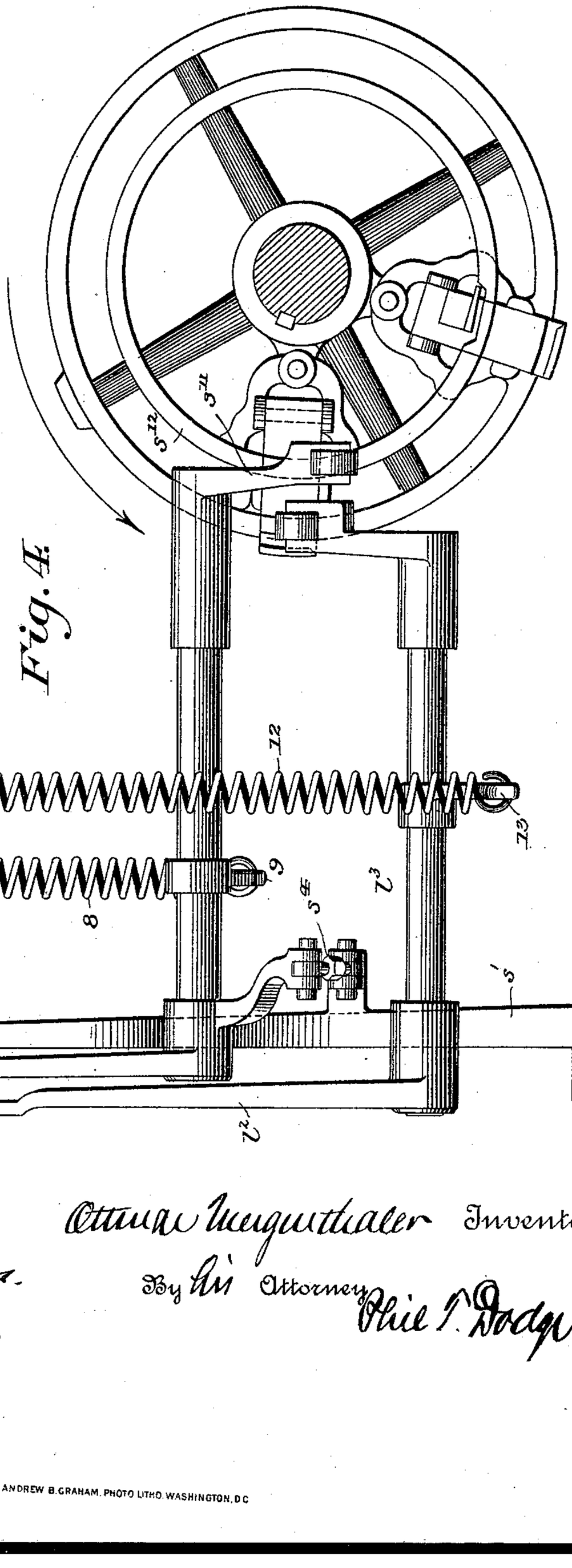

Fig. 4.

Witnesses
Raymond F. Barnes.
Fabius S. Elmore

Ottmar Mergenthaler Inventor
By his Attorney Philip T. Dodge

(No Model.)

6 Sheets—Sheet 5.

O. MERGENTHALER.

LINOTYPE MACHINE.

No. 557,000. Patented Mar. 24, 1896.

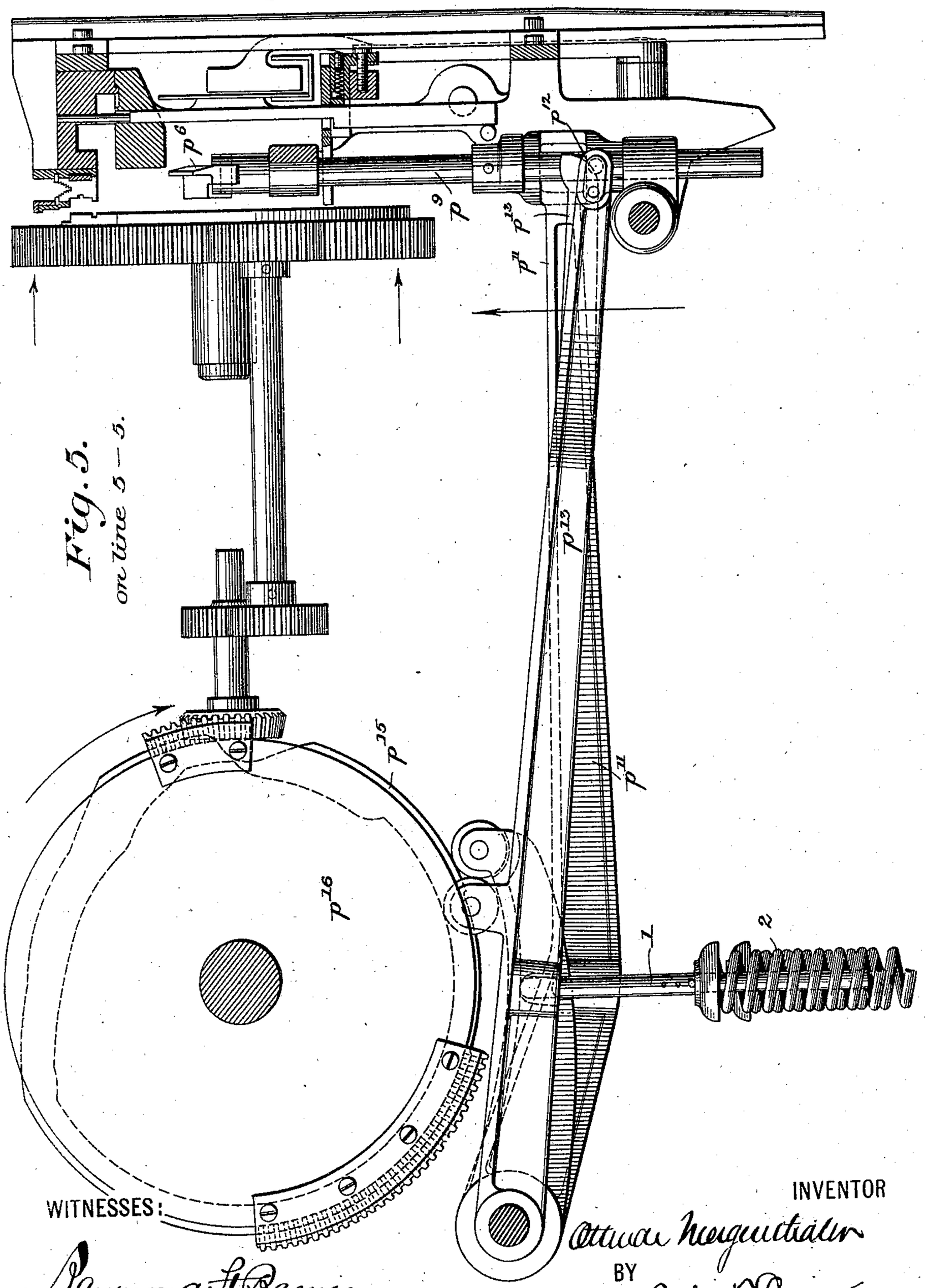

Fig. 5.

on line 5—5.

WITNESSES:

Raymond H. Barnes.

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(No Model.) 6 Sheets—Sheet 6.

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LINOTYPE MACHINE.

No. 557,000. Patented Mar. 24, 1896.

Fig. 6.

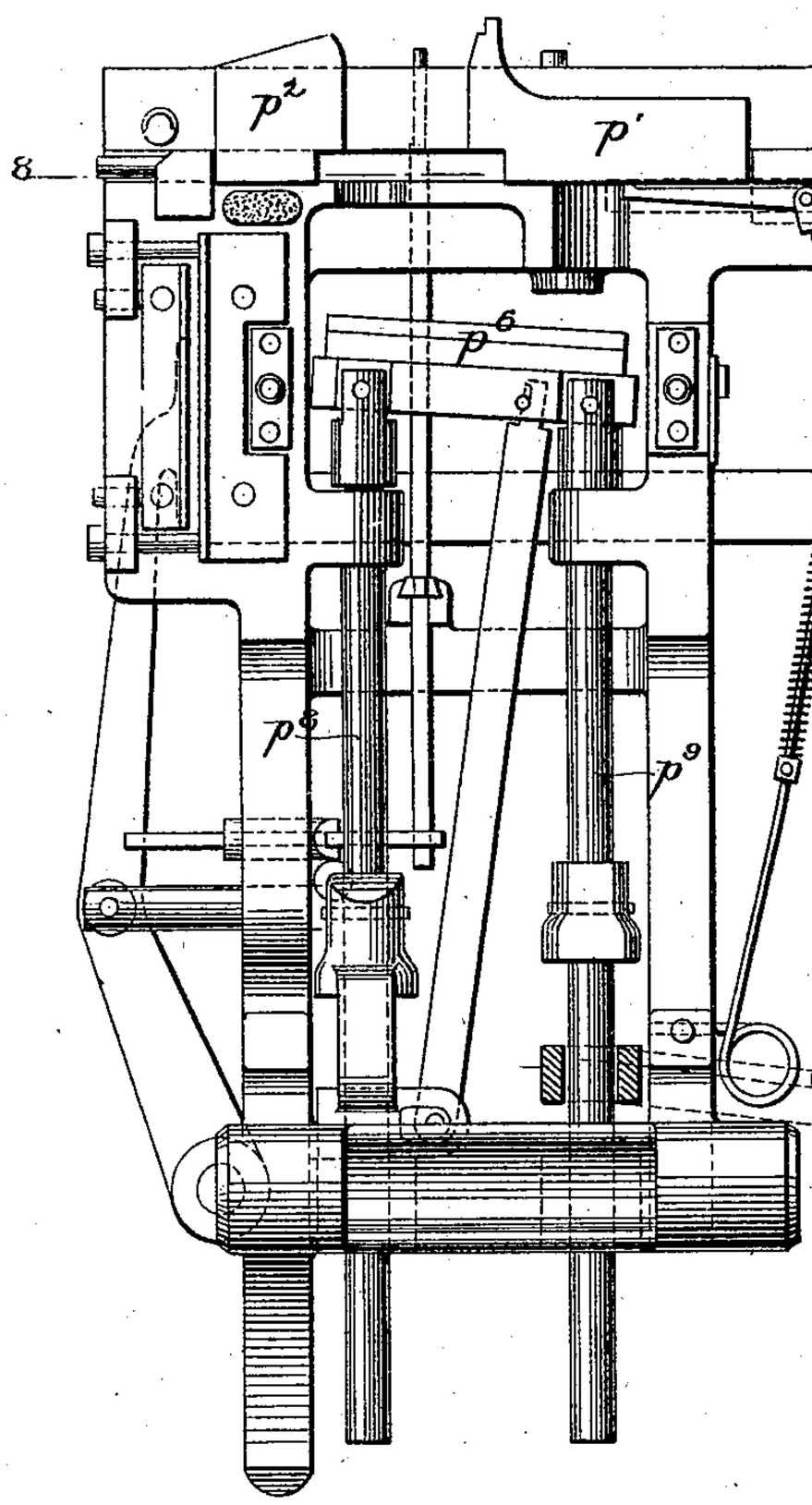


Fig. 7.

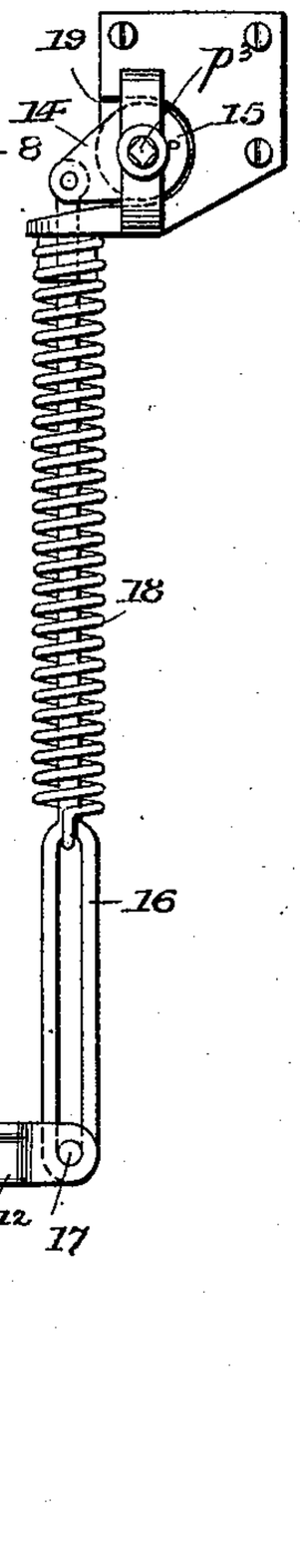
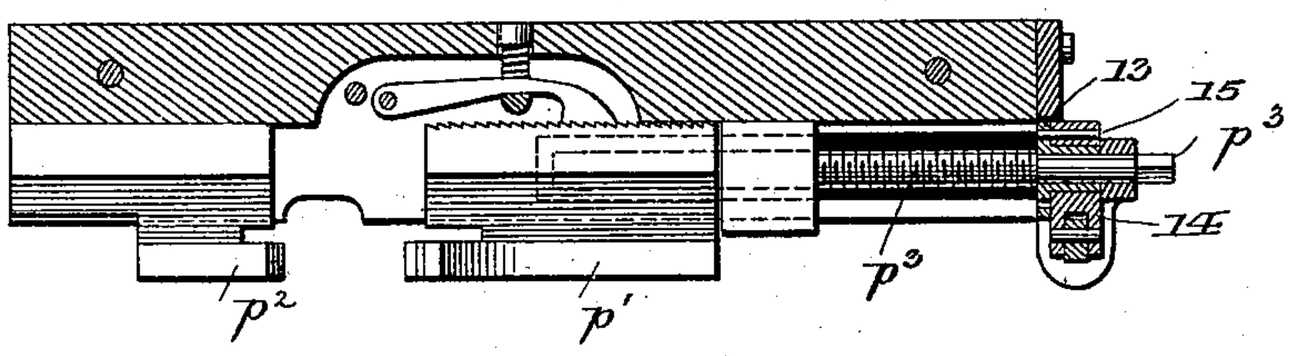


Fig. 8.

on line 8—8.



WITNESSES:

Raymond L. Barnes

Fabius A. Elmore

INVENTOR

Ottmar Mergenthaler

BY Alice T. Dorsey

ATTORNEY

UNITED STATES PATENT OFFICE.

OTTMAR MERGENTHALER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE MERGENTHALER LINOTYPE COMPANY, OF NEW JERSEY.

LINOTYPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 557,000, dated March 24, 1896.

Application filed July 25, 1893. Serial No. 481,417. (No model.)

To all whom it may concern:

Be it known that I, OTTMAR MERGENTHALER, of Baltimore city, in the State of Maryland, have invented a new and useful Improvement in Linotype-Machines, of which the following is a specification.

This invention has reference to the well-known Mergenthaler linotype-machine of the general character represented in Letters Patent of the United States, issued on the 16th day of September, 1890, No. 436,532; and it consists in various details of construction or more particularly to devices for transferring the lines and for operating the justifying devices.

Figure 1 represents a front elevation of the linotype-machine having my improvements incorporated therein. Fig. 2 is a side elevation of the same. Fig. 3 is a rear elevation, partly in section, showing the line-transferring devices. Fig. 4 is a side elevation of the line-transferring devices. Fig. 5 is an elevation, partly in section, showing the justifying mechanism as a whole. Fig. 6 is a face view of the inner side of the devices for confining the matrices in front of the mold, commonly known as the "vise" and the "space-operating" devices. Fig. 7 is an end view of the same. Fig. 8 is a horizontal section on the line 8 8 of the preceding figures.

In all parts, except those hereinafter specified, the machine may be of the same construction as that represented in my prior Letters Patent above referred to.

In order that the nature of the invention may be the more readily understood, I will indicate the leading parts by the same letters as in the patent before mentioned and will indicate the new or improved parts by numerals.

It comprises as the leading features the main frame A, an inclined channeled magazine B in which the letter-matrices are stored, a series of finger-keys D acting through intermediate devices to discharge the matrices one at a time from the magazine through channels G to a traveling belt H, by which they are delivered, together with suitable spaces, from the magazine K into an assembling-block I. This assembling-block I may be lifted at will to present a composed line of matrices and spaces between horizontally-moving shifter-fingers L, by which the line is transferred from the elevated assembler-block through the intermediate channeled guide M to a yoke or elevator N, by which the line is lowered to a casting position in front of the mold in the mold wheel or disk O. The line thus presented in front of the mold is confined between the two jaws p' and p^2, which determine the length to which it is extended by the justifying action, so as to produce the successive lines of uniform length. After the casting operation the yoke N rises from the mold to a position above its original level in order that the line may be transferred from it by means of a horizontal slide S into a stationary guide R, the matrices being thus engaged with a vertically-swinging elevator, by which they are lifted to the distributer X at the top of the machine, while the elongated spaces remaining behind in the guide R are engaged by a horizontally-reciprocating hook U and shifted to the right into their magazine K.

While the composed line is presented in a casting position in front of the mold the wedge-like spaces are thrust through the line to effect justification by a lifting-plate p^6 thereunder.

The foregoing parts are of the same general construction and arrangement and operate in the same manner as those described in the original patent, except as to the details hereinafter pointed out.

In my former machine the plate p^6 for lifting the spaces through the line is operated at its two ends independently through the medium of weighted levers. I now do away with these levers and operate this bar through the medium of springs, in the manner shown in Figs. 1, 2, and 5. The two ends of the bar p^6 are sustained, as before, by two vertically-sliding rods p^8 and p^9, which are in turn actuated, respectively, by levers p^{11} and p^{13}. The lever p^{13} is acted upon by a lifting-rod 1, sustained by a strong spiral spring 2, the upper end of which acts against a collar on the rod, while the lower end bears in a stationary cup or other fixed support 4. The lever p^{11} is independently sustained by spring connections of the same character, its lifting-rod 5

being sustained by spiral springs 6. The springs arranged as above serve to urge the two ends of the space-lifting bar p^6 independently, so that it exerts a yielding pressure in forcing the spaces upward through the line. The levers are depressed after the close of the justifying action to lower the plate p^6 by means of cams p^{15} and p^{16}, mounted on the main shaft and acting against rollers on the respective levers, as plainly shown in Fig. 5. These cams serve also to control to a certain extent or during certain periods of time the ascent of the levers therefrom and relative arrangement being such that the plate p^6 is caused to first assume an inclined position, in order that it may in rising lift the spaces successively through the line, after which it assumes a horizontal position, under the influence of the springs and when the levers are relieved by the cams, to complete the justification.

While it is preferred to make use of two levers and springs in order to give the tipping or rocking motion to the adjusting-plate as it rises, it is to be unders ood that the plate p^6 may be connected with one of the lifting-rods p^8 rigidly, and that in such case a single spring and cam will serve to effect justification. In such case, however, the plate p^6 will be raised and lowered in a horizontal position and without the tipping action which attends the use of the two independent lifting-rods p^8 and p^9.

The employment of springs as distinguished from weights to effect justification is advantageous in that the weight of the machine is reduced and that the increased momentum and forcible impact which attends the use of weights is avoided. The springs carry the spaces home to their places with a gentle yielding pressure without unduly straining the parts.

The collars against which the lifting-springs act are adjustable vertically on their rods, being secured by transverse pins applied through one or another of the series of holes in the rod, as shown in Fig. 5. This admits of the tension of the spring being varied as it may be demanded.

Any other equivalent means for adjusting the spring may be substituted.

It will of course be understood that the levers are simply a convenient means for transferring motion from the springs to the plate p^6, and that any equivalent connection known to the skilled mechanic will fall within the scope of my invention.

The slide S for transferring the line of matrices and spaces from the yoke or elevator N is operated through an intermediate link s^8 on an upright lever s^7, the shaft of which has a depending arm s^{11} arranged to bear against the side face of a cam-wheel s^{12}, as in the former machine. This shaft is also provided with an arm connected to link s^4, with the second lever s', by which the hook u is carried, to transfer the spaces. These connections are essentially the same as in the original; but instead of applying a retracting-spring to the arm s', in the manner described in the original patent, I now make use of a sprial spring 8, the upper end of which is secured to the main frame, while the lower end is attached to an arm 9, projecting from the shaft of lever s^7, as shown in Fig. 3.

It is found that the retracting-spring thus applied imparts an easier and more satifactory movement than can be obtained by the spring in the original form. The upper end of spring 8 is attached to the frame through a vertically-adjustable eyebolt 10, so that its tension may be varied.

The shifted carriage L is operated as in the original machine through a connecting-link l^5 from the lever l^2 on the horizontal shaft l^3. The retreat of this lever and carriage will be effected by cam connections, as in the original machine and as shown in the present drawings. The carriage is advanced, as before, by a spring; but instead of arranging the spring in the original manner I now make use of a contractile spiral spring 12, the lower end of which is attached to the arm 13, projecting from the lever-shaft l^3, the upper end of the spring being connected to the frame by an adjustable eyebolt 14, as plainly shown in Fig. 3.

A line of matrices sustained in front of the mold by the yoke or elevator N is limited as to its elongation endwise by two jaws or abutments p' and p^2, the former being arranged to slide horizontally and being supported on the outside by an adjusting-nut mounted on a screw p^3, which is fixed against end motion, so that its rotation serves to adjust the nut and maintain the jaw p' at a predetermined distance from its companion.

It is desirable to open and close the jaw p' to a limited extent during and after the justification of the line. Instead of effecting this by the rack-bar and pinion, as in the former machine, I now fix on the end of the screw a collar 13, having a hub which carries a crank-arm 14, fastened thereto by a pin 15. This crank-arm is provided with a rod 16, which is extended downward and slotted at its lower end to receive a pin 17 in the operating-lever p^{12}. A contractile spiral spring 18, the upper end of which is fixed to the vise-frame, while the lower end engages and lifts the rod 16, causes it, through the crank, to turn the screw and close the vise-jaw to the required extent, the motion of the crank and screw being limited by a shoulder 19 on the frame or any other equivalent stop. By removing the pin 15 the crank may be disconnected, so as to permit of the screw being turned independently to adjust the jaw p' according to the length of line demanded, after which the pin is reinserted.

The lever p^{12}, in descending, causes the retraction of the jaw p'. When the lever is re-

leased by its actuating-cam or other actuating device, the spring acts to close the jaw to the proper point. The spring and screw give to the jaw a practically rigid support, so that the distance between the two jaws will exactly correspond with the required length of line.

Having thus described my invention, what I claim is—

1. In combination the shifter-carriage, its actuating-lever s^7, a lever-controlling cam, and contractile spring 8 connected with the lever, substantially as described.

2. In a linotype-machine and in combination with a movable matrix-confining jaw, an adjusting-screw, spring connections tending to rotate the screw and to close the jaw, and mechanism for turning the screw backward against the stress of the spring.

3. In a linotype-machine and in combination with the sliding jaw, its actuating-screw, the crank thereon, and spring and rod tending to turn the screw in one direction, and the lever acting on the rod to reverse the motion of the screw.

In testimony whereof I hereunto set my hand, this 18th day of July, 1893, in the presence of two attesting witnesses.

OTT. MERGENTHALER.

Witnesses:
FELIX R. SULLIVAN,
JNO. J. SAUNDERS.