

(No Model.)

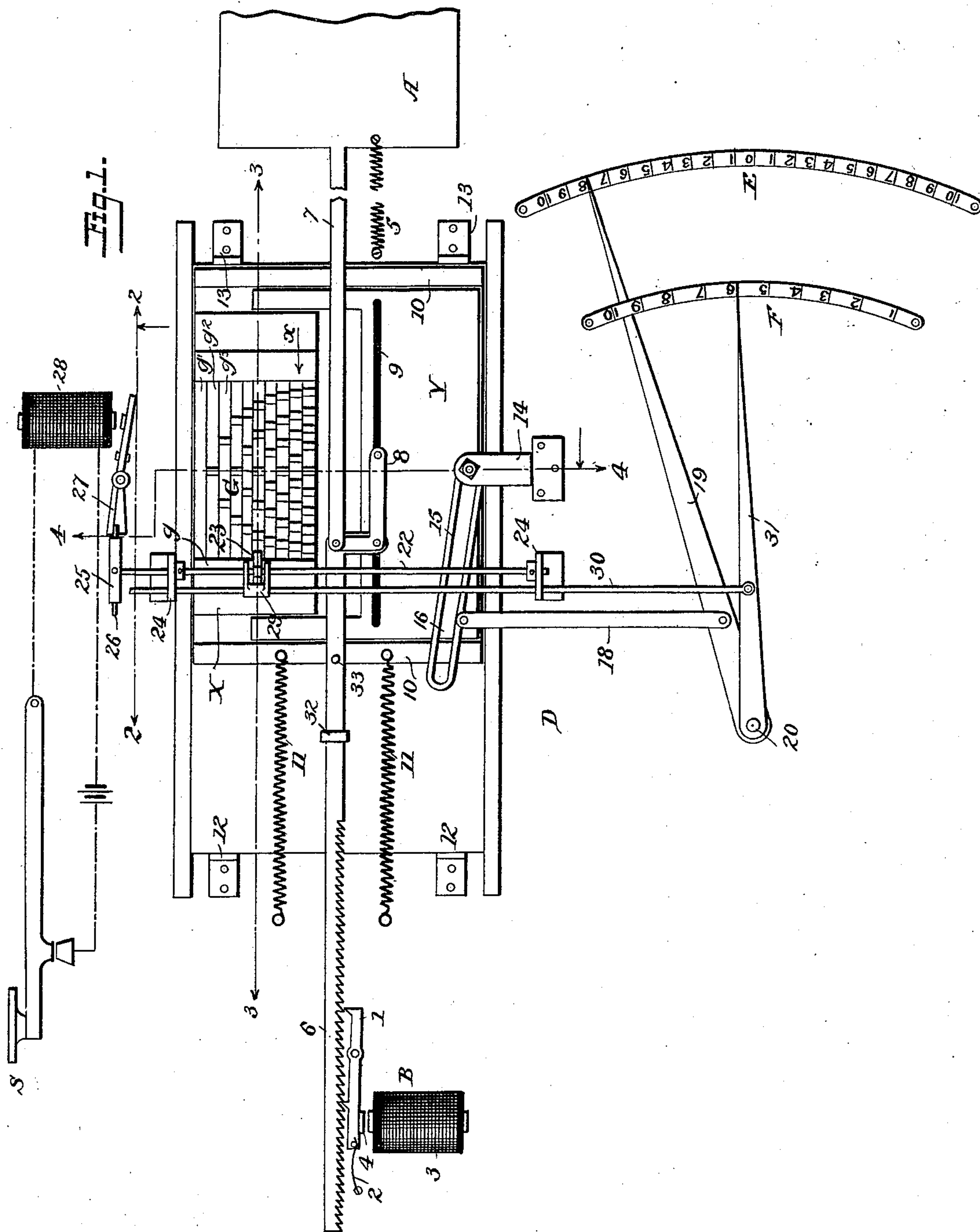
2 Sheets—Sheet 1.

J. A. WATSON.

JUSTIFYING MECHANISM FOR MATRIX MAKING MACHINES.

No. 510,305.

Patented Dec. 5, 1893.



Witnesses

Witnesses
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Inventor

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

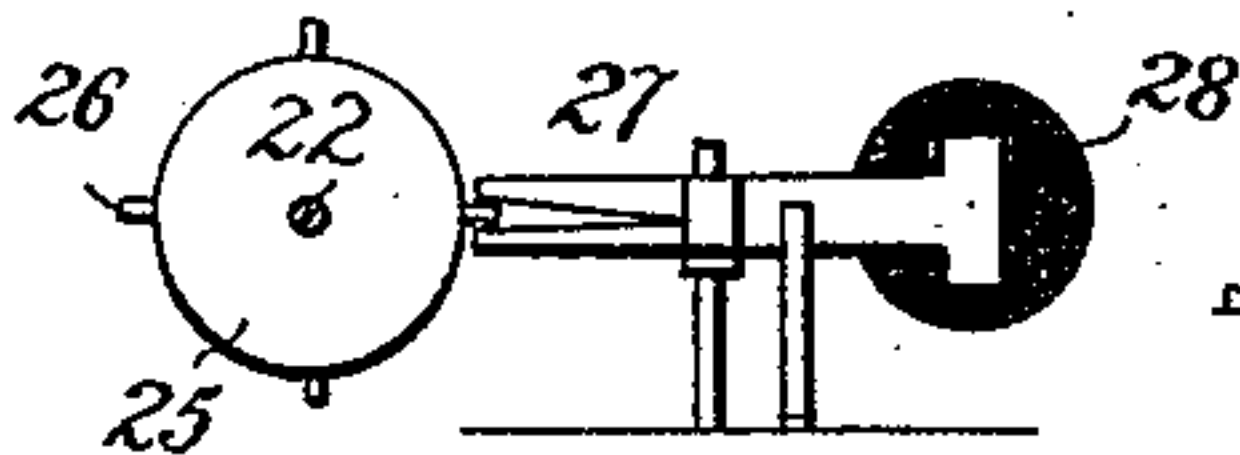


Fig. 3.

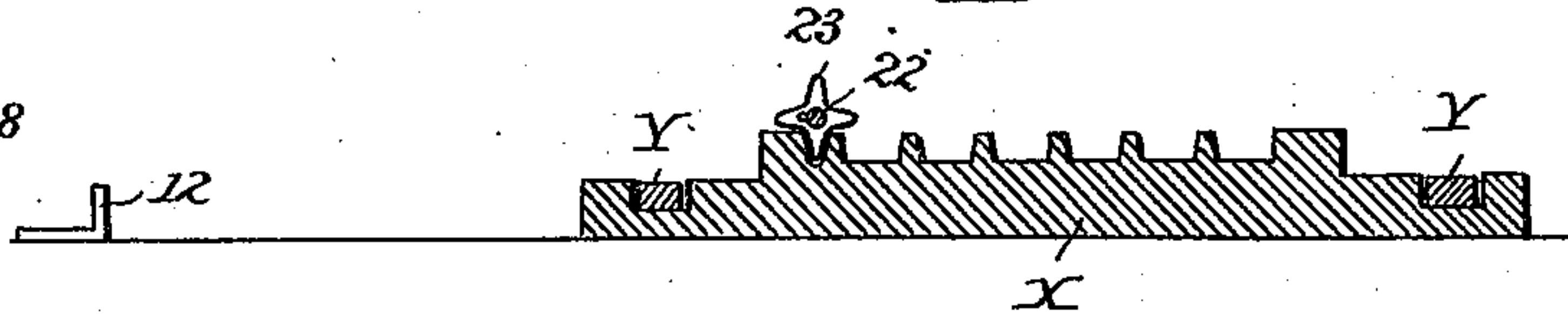


Fig. 4.

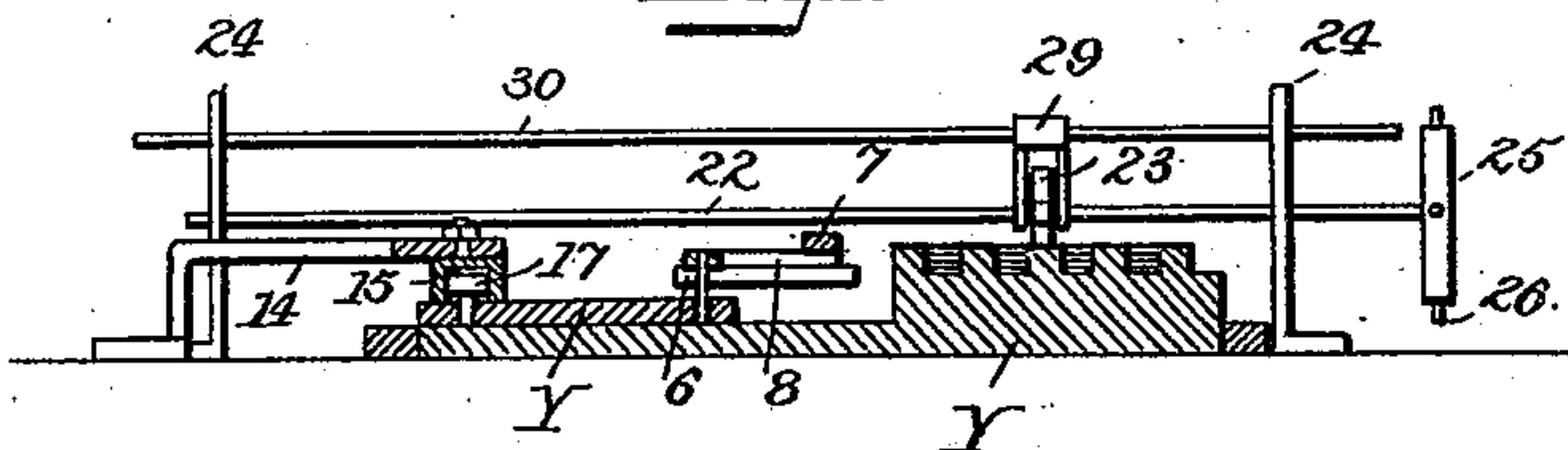
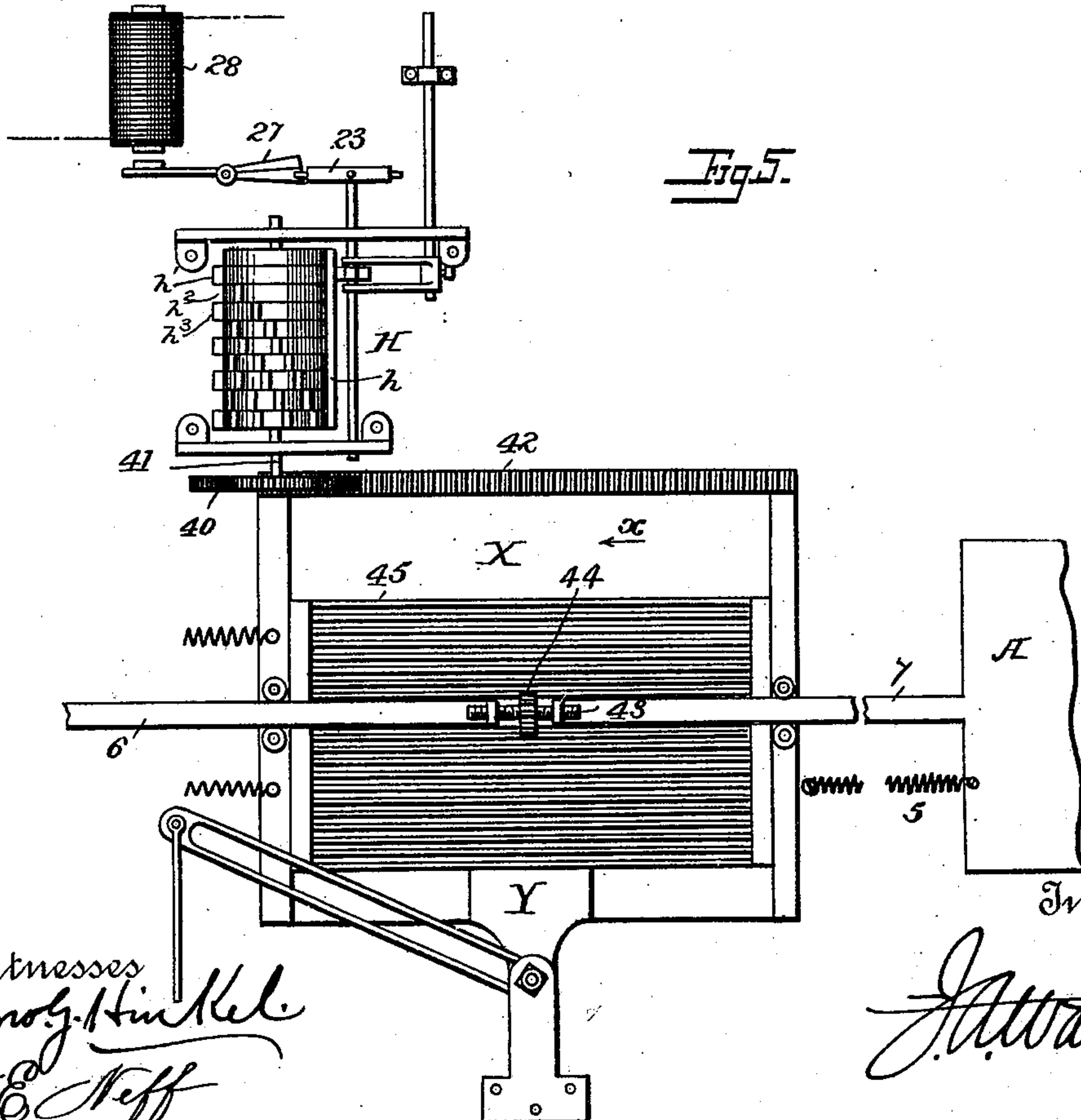


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES A. WATSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

JUSTIFYING MECHANISM FOR MATRIX-MAKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 510,305, dated December 5, 1893.

Application filed June 29, 1892. Serial No. 438,468. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. WATSON, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Feeding and Justifying Mechanism, of which the following is a specification.

My invention relates to improvements in justifying mechanism for matrix making machines and typewriters and it consists in various novel devices and combinations of devices which will be hereinafter described.

In the accompanying drawings, which form part of this specification, Figure 1 is a plan view illustrating one embodiment of my invention. Figs. 2, 3 and 4 are cross sections taken on the lines 2—2, 3—3 and 4—4 respectively, Fig. 1, and Fig. 5 is a plan view of a modified form.

In forming lines of print or lines of impressions by means of typewriters or matrix making machines it usually happens that matter must be so divided that the lines would be of irregular length if the usual word and letter spacing were adhered to. It is therefore necessary in most cases to allot to a line more or less matter than will fill it to a length corresponding with the width of the column, and then to contract or expand the line to the desired length. The difference between the length of a line when spaced normally and the desired length, or the width of the column, I will hereinafter term the variation space.

The present invention has for its object justifying mechanisms which will automatically divide any amount of variation between a proposed line and the width of a column, whether by way of addition or subtraction, equally among the word spaces of a line or any desired number of such word spaces. Thus, for example, if there are eighteen units of surplus space and six spaces, three of the units may be added to each space, or four and one-half units to each of four spaces, or six units to each of three spaces, as desired.

I accomplish the above results by combining with the usual or main feeding device a supplemental feeding device for correcting the variation in space and a controller for the supplemental feeding device constructed to permit it to add or subtract the total amount

of variation space at one movement, or to cause it to divide the variation space into equal parts and add or subtract one of said parts each time the main feeding device feeds a space between words, the parts of variation space being added to or subtracted from the word spaces to justify the line.

Referring to Figs. 1 to 4 inclusive of the drawings, A indicates the carriage for supporting the matrix material or paper to be impressed and B indicates a feeding device for moving the carriage to accomplish the usual word and letter spacing. The feeding device B may be of any form suitable for the purpose, either an escapement or positive feed, and adapted to impart to the carriage either uniform or variable movements. The form shown consists of a vibrating pawl carrier 1 centrally pivoted and having two pawls which engage alternately with the teeth of a rack 6. One of the pawls is held normally engaged with the rack by means of a spring 2 and the pawl carrier is vibrated through the medium of a magnet 3 and an armature 4 mounted on the said carrier. The carrier is impelled in the direction of the arrow by means of a spring 5 or other suitable motor.

The supplemental feeding device consists in mechanism adapted to move the carriage independently of the main feeding device. One form of such device is shown in my prior Patent No. 435,338. In the present instance, the supplemental feeding device D is constructed as follows: The rack 6 is connected to a bar 7 upon the carriage by a link forming one arm of an elbow lever 8 which link is pivoted at its extremities to the adjoining ends of the parts 6—7. The other arm of the elbow lever carries a pin which enters a slot 9 in a slide Y. It will be evident that when the slide Y is moved in either direction that the elbow lever will be rotated and the connecting rod 7 moved relatively to the feed rack, thus giving an independent movement to the carriage.

The slide Y is mounted in guides 10 upon a slide X which in turn slides upon the main frame in a direction parallel with the movement of the carriage and at right angles to the line of movement of the former slide. The slide X is impelled in the direction of the arrow x by any suitable means such as the

springs 11—11, and its movement in either direction is limited by stops 12 and 13.

Upon the main frame adjacent to the slide X is a lug or bearing 14 which extends over the slide X and to which is pivotally connected one end of a guide rail 15. This guide rail is preferably formed with a longitudinal groove or slot 16, one end of which is at its pivotal point. Into this slot 16 projects a pin 17, provided with an antifriction roller, which is mounted upon the slide Y. When the guide rail 15 is set at an angle to the direction of movement of the slide X it will be seen that the slide Y and the elbow lever will have a certain amount of movement imparted to them when the slide X is moved from one end to the other of its path, this amount of movement depending upon the angle at which the guide rail is set.

The guide rail 15 is connected by a link 18 with a pointer 19 which is pivoted to the main frame at 20. Adjacent to the free end of the pointer is a scale E having graduations corresponding to the various amounts of variation space which it may be necessary to add or subtract to justify the line. The parts are so adjusted that when the pointer 19 is set at the graduation corresponding with the amount of variation space, either plus or minus, for a line, the guide rail will be set at such an angle that the slide Y and elbow lever will give the necessary amount of supplemental movement to the carriage as the slide X travels from one extreme to the other of its path. Thus any amount of space may be added to or subtracted from a line by simply setting the pointer 19 at the proper graduation before beginning to form the line.

It may be necessary to throw in the variation space all at once in case there are only two words and one space in the line, or to divide it into several equal parts when there are several word spaces in the line, and I provide the supplemental feed with a suitable controller for this purpose. Connected to the slide X is a series of sets of stops G shown in Figs. 1 to 4 in the form of a series of racks each having one or more teeth. One of the teeth g is common to all of the racks and is located at their forward end. The remaining teeth are arranged to divide the racks into halves, thirds, &c. Thus the rack g' has but the one tooth, g , the rack g^2 has a central tooth dividing it into two halves, the rack g^3 has two extra teeth dividing it into thirds, &c. Upon a shaft 22, a pinion 23 is splined so that it may slide upon the shaft to engage the teeth of either rack, the shaft being mounted in bearings 24 upon either side of the slide X. Upon one end of the shaft is an escape wheel 25 having teeth 26 corresponding in number to the teeth upon the pinion 23 and adjacent to the wheel 25 are pawls 27 operated by a magnet 28 and arranged to permit one of the teeth 26 to pass each time the magnet is energized. The magnet 28 is in a circuit con-

trolled by the space key S, so that each time said key is operated to space between words, the magnet 28 will operate the escapement and permit the shaft 22 to make a partial revolution thus allowing the rack G to move under the influence of the springs 11. The pinion 23 is moved upon the shaft 22 by means of a yoke 29 upon a rod 30 which is connected to a pointer 31, which pointer may also be pivoted at 20 to the main frame. The pointer 31 is governed by a scale F having a series of graduations corresponding to the various numbers of word spaces in different lines. To cause the variation space for any given line to be divided into a number of equal parts corresponding to the word spaces in the line, the pointer 31 is set at the corresponding graduation and the pinion 23 moved to the corresponding rack or set of stops. As shown in the drawings eight units of space are to be added to a line and divided among six word spaces. In forming the line when the first word space is struck the pinion 23 will be permitted to make a quarter turn and the slide X will move one-sixth of its entire travel which will give the slide Y and the supplemental feed, a corresponding movement. At the end of each line, the carriage and the slide X are to be moved back to their starting points. These movements may be accomplished at the same time, as, for instance, by means of a collar 32 which is loose upon the feed rack 6 and which when pressed toward the carriage will engage a stud 33 upon the feed rack and also engage the slide X and carry both the carriage and the slide to their initial positions. The slide Y will automatically return to its initial position when the slide X is returned.

In Fig. 5 I have shown a controller H for the supplemental feed in the form of a series of pinions, or a cylinder having a series of sets of stops or teeth. One of the teeth h runs the entire length of the cylinder and the successive sections h' , h^2 , h^3 are provided with, teeth which divide them into halves, thirds &c., in the same manner in which the multiple rack G above described is divided. The pinion 23 which forms a detent for the stops of the controller and the escape mechanism for releasing the detent are the same as shown in Fig. 1. The connection between the controller H and the slide X consists of a pinion 40 mounted upon the shaft 41 and in mesh with a rack 42 upon the slide X. In this view the supplemental feeding device consists of a right and left hand screw 43 connecting the rack 6 with the bar 7 which is attached to the carriage. The screw 43 carries a pinion 44 which meshes with a rack 45 having elongated teeth, said teeth being mounted upon or forming part of the slide Y. The operation of the controller shown in Fig. 5 is similar to the operation of that shown in Figs. 1 to 4 and a detailed description may therefore be omitted. The supplemental feed, it will be

obvious, is caused by the rack 45 turning the right and left hand screw 43 and thereby changing the relation of the carriage to the feed rack.

5 What I claim is—

1. In a typewriter or matrix machine, the combination with the carriage and the word and letter spacing mechanism, of a justifying device constructed to add to or subtract from
10 any desired number of the word spaces of a line the entire variation space, substantially as described.

2. In a typewriter or matrix machine, the combination with the carriage and the word
15 and letter spacing mechanism, of a justifying device constructed to add to or subtract from a line the variation space and a controller for the justifying device whereby said space may be divided into any desired number of equal
20 parts, substantially as described.

3. In a typewriter or matrix machine, the combination with the carriage and word and letter spacing mechanism, of a justifying device constructed to add or subtract the varia-
25 tion space, a controller for said device, a spacing key and connections between said controller and the spacing key, substantially as described.

4. In a typewriter or matrix machine, the
30 combination with the carriage and the word and letter spacing mechanism, of a justifying device, and a controller for said device consisting of a series of sets of stops and means for bringing into action any selected set of
35 stops to govern the justifier, substantially as described.

5. The combination with a carriage, a main feeding device, and a supplemental feeding device, of a series of sets of stops for control-
40 ling the supplemental feeding device whereby the total movement of said supplemental feeding device may be divided into any desired

number of equal parts, substantially as described.

6. The combination with the main feeding device, the supplemental feeding device, the series of sets of stops, the escapement for said stops and means connected with the space key for operating the escapement, substantially
45 as described. 50

7. The combination with the main feeding device, the supplemental feeding device, and the controller for the latter, of two setting devices, one for the supplemental feeding de-
55 vice and one for the controller, substantially as described. 55

8. The combination with the main feeding device and the supplemental feeding device of a controller for the latter consisting of a series of sets of stops, one stop being common
60 to all of the sets, and an escapement consisting of a pinion arranged to engage said stops and means for limiting the movement of the pinion, substantially as described. 65

9. The herein-described supplemental feed-
ing device consisting of the slide X movable in guides parallel to the carriage the slide Y mounted upon the slide X, the guide rail, and a device connecting the slide Y with the feed
70 rack and carriage, said device being constructed to move the carriage relatively to the feed rack, substantially as described. 75

10. The herein described controller for feed-
ing devices consisting of a series of sets of stops, an escapement therefor, and a shift-
75 able connection whereby the escapement may be put in engagement with either set of stops, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES A. WATSON.

Witnesses:

WILL E. NEFF,
G. P. KRAMER.