(No Model.) 3 Sheets—Sheet 1.

W. W. STREET.

ATTACHMENT FOR TYPE WRITING MACHINES.

No. 427,712. Patented May 13, 1890.

Fig. 1.

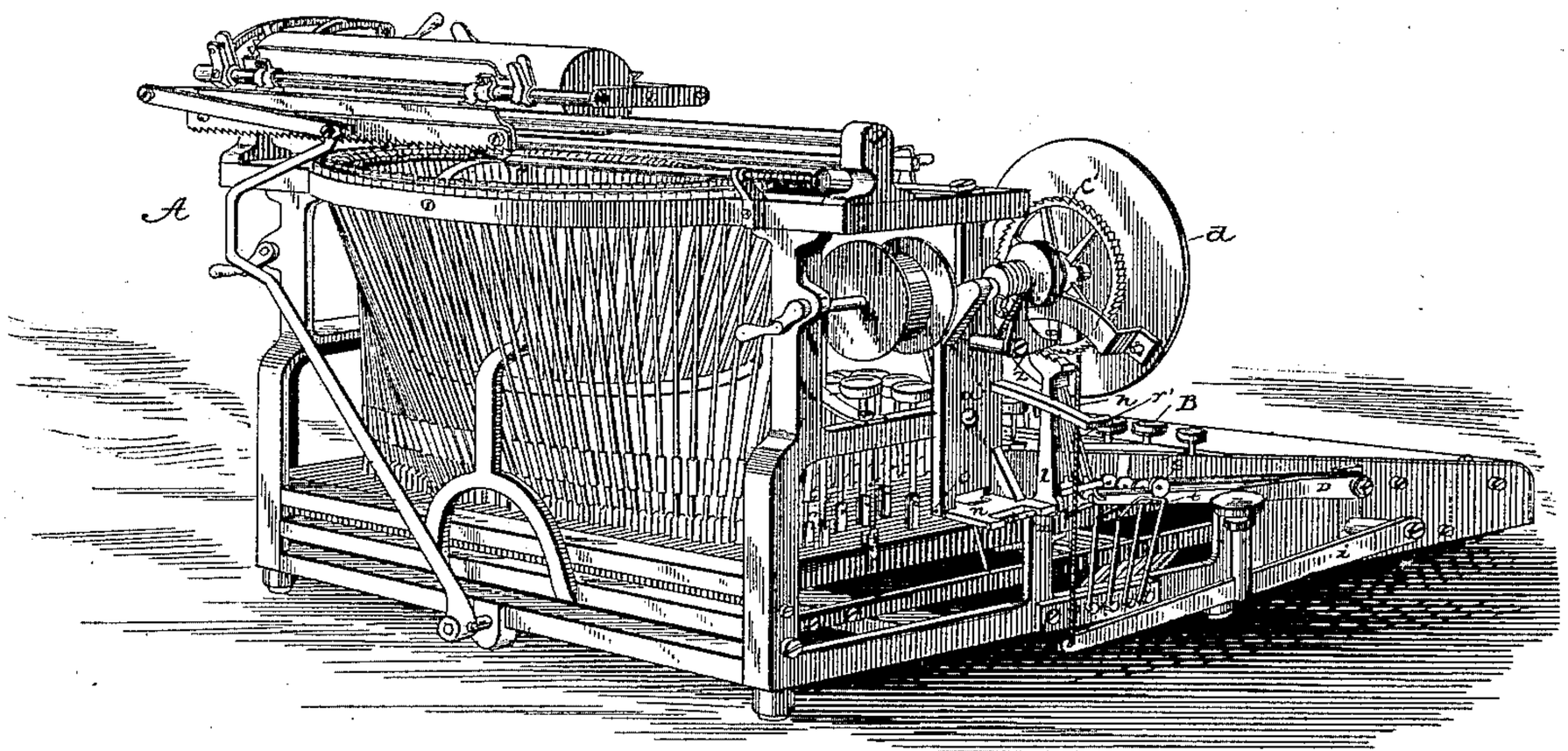
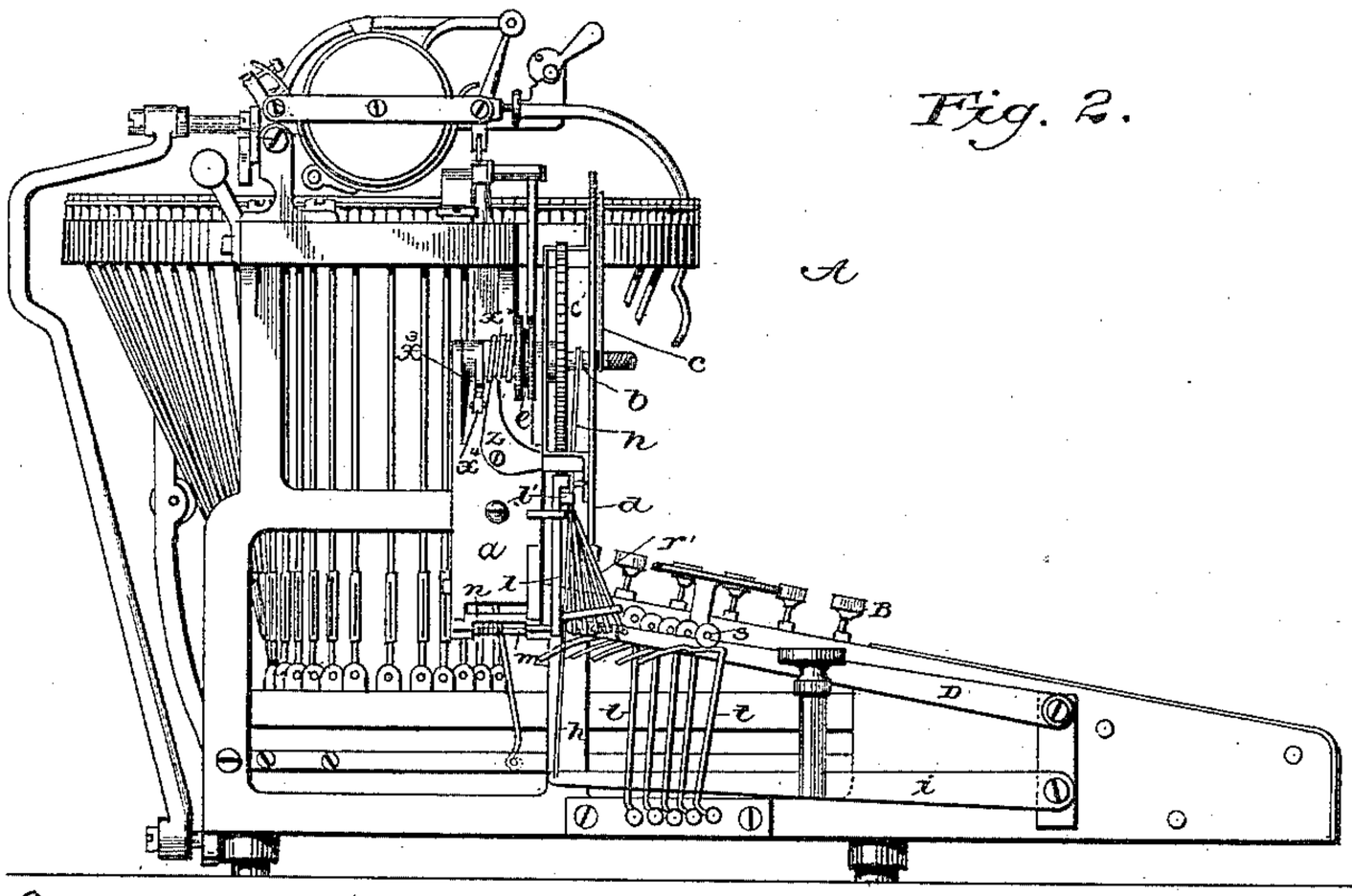


Fig. 2.



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A. R. Kennedy

Inventor:
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By his Atty
Phil. T. Dodge.

(No Model.) 3 Sheets—Sheet 2.

W. W. STREET.

ATTACHMENT FOR TYPE WRITING MACHINES.

No. 427,712. Patented May 13, 1890.

Fig. 3.

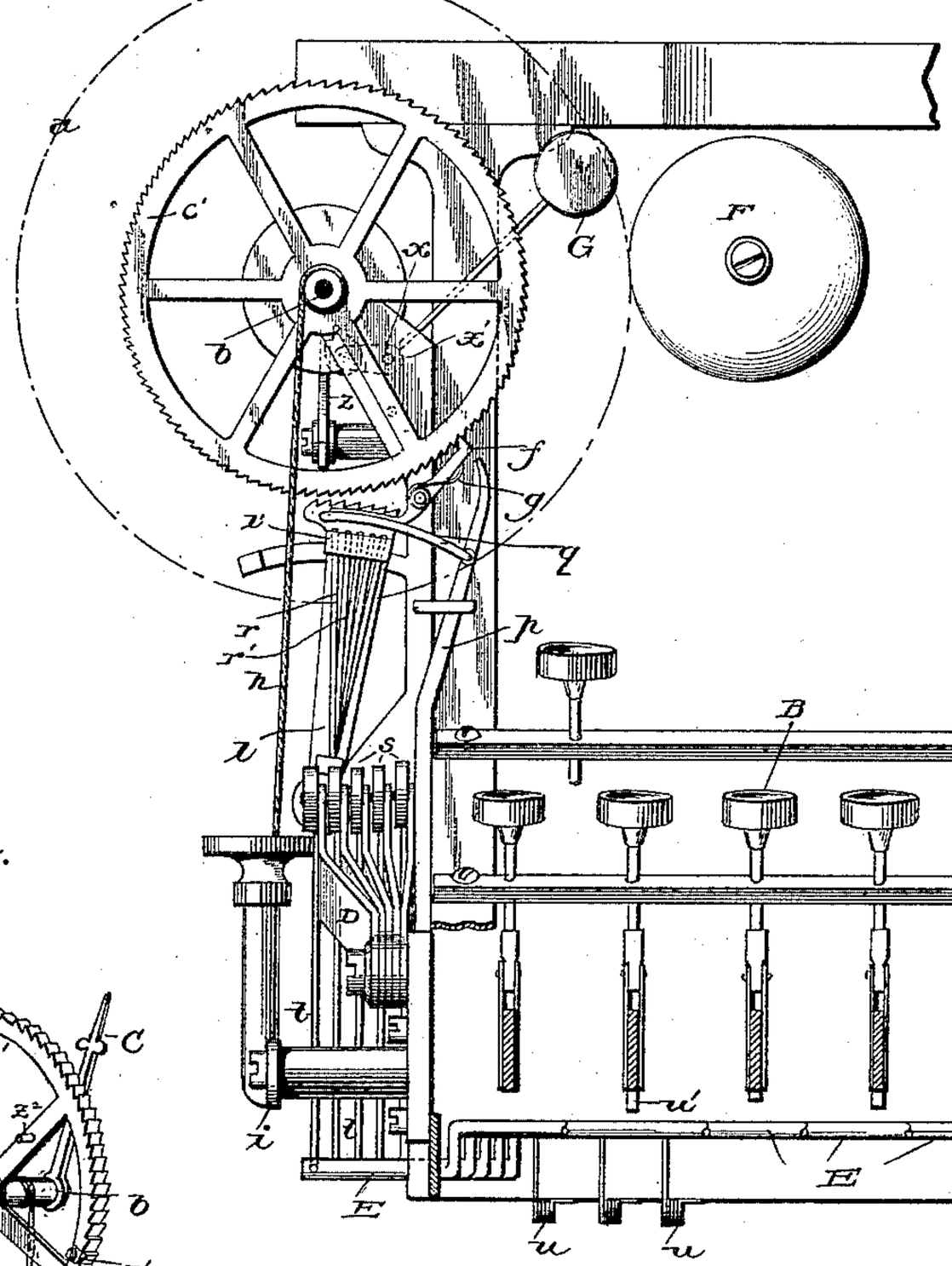
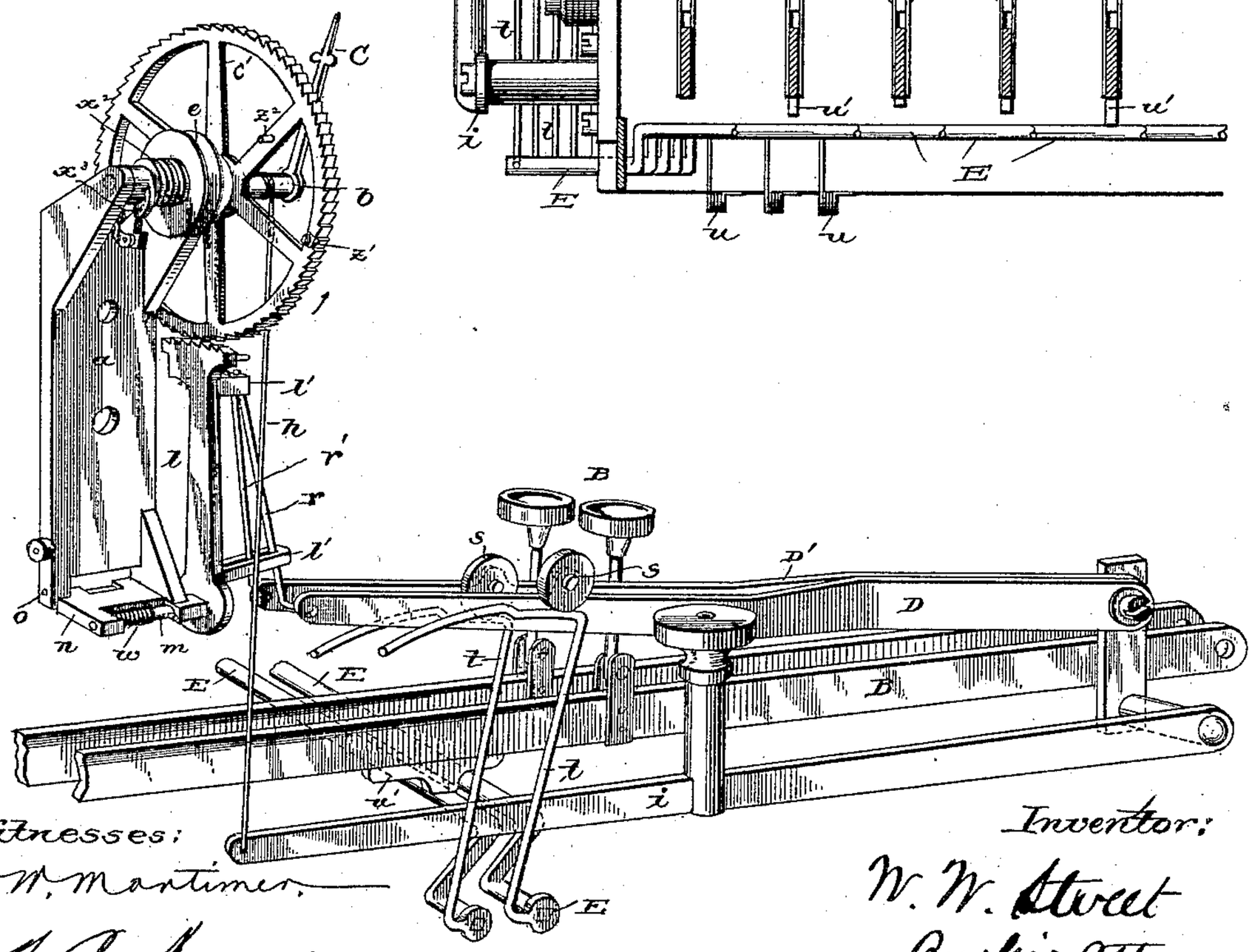


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

W. W. STREET.

ATTACHMENT FOR TYPE WRITING MACHINES.

No. 427,712. Patented May 13, 1890.

Fig. 6.

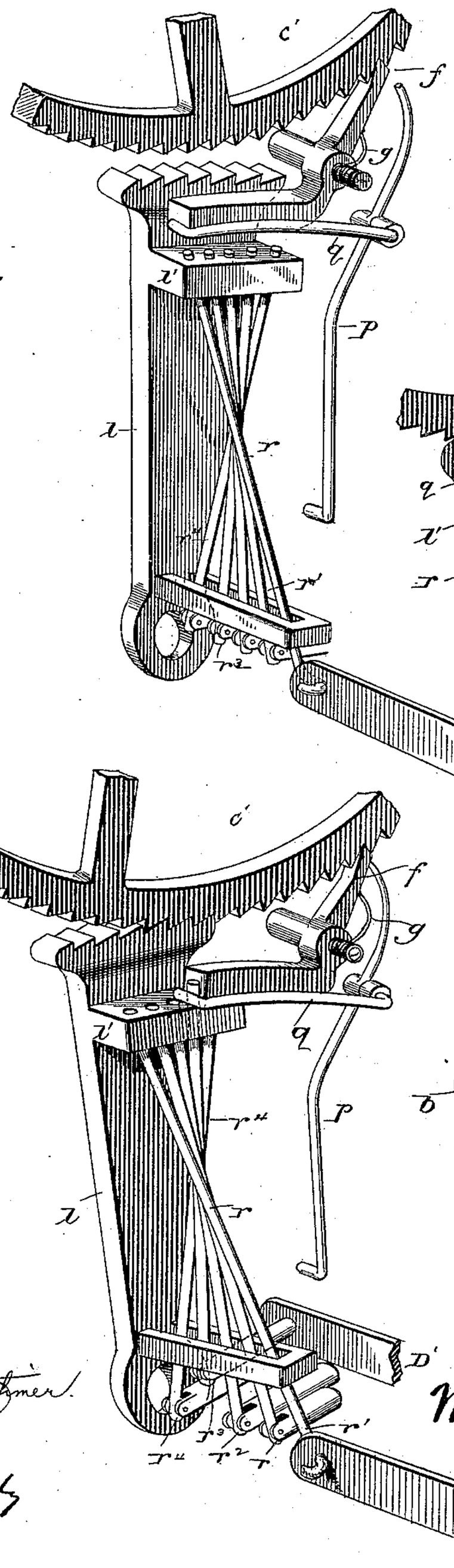


Fig. 5.

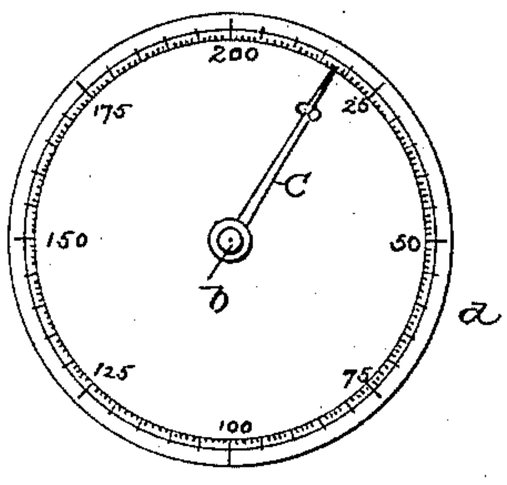


Fig. 9.

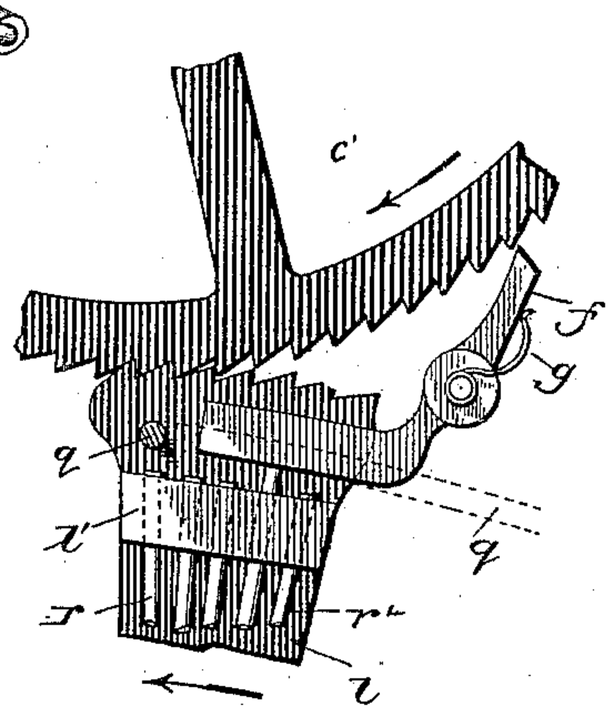
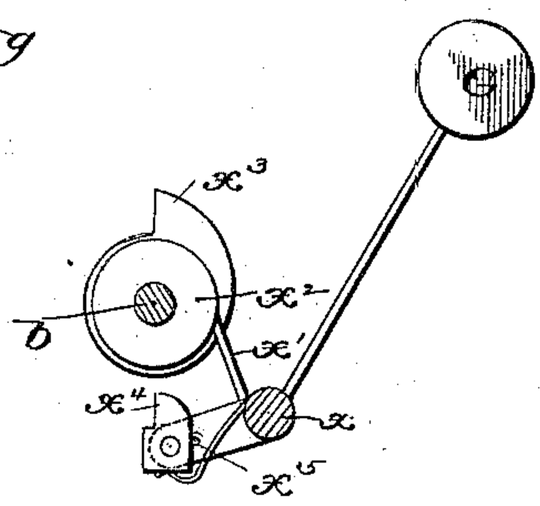


Fig. 7.

Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLOUGHBY W. STREET, OF CHICOPEE, MASSACHUSETTS, ASSIGNOR TO THE MINNEAPOLIS ELECTRO-MATRIX COMPANY, OF MINNEAPOLIS, MINNESOTA.

ATTACHMENT FOR TYPE-WRITING MACHINES.

SPECIFICATION forming part of Letters Patent No. 427,712, dated May 13, 1890.

Application filed June 19, 1889. Serial No. 314,796. (No model.)

To all whom it may concern:

Be it known that I, WILLOUGHBY W. STREET, of Chicopee, in the county of Hampden and State of Massachusetts, have invented certain Improvements in Attachments for Type-Writing Machines, of which the following is a specification.

My invention relates to an attachment for an ordinary type-writing machine which spaces equally for all the characters printed, to be used in the production of copy to be reproduced on matrix-machines which have a variable spacing corresponding to the width of the characters printed.

In the reproduction on the matrix-machines it is necessary that the matter in each line shall "justify"—that is to say, space out evenly at the end of the line. I propose to prepare the copy on an ordinary type-writer, so that when rewritten on the matrix-machine line for line it will appear properly justified. To this end I provide the type-writer with an indicator connected with the respective keys in such manner that whenever a key is operated to print a character the indicator will point off a number of units representing the width of the same character in the matrix-machine. The operator manipulates the type-writer as usual, thereby advancing the indicator step by step irregular distances. When the number of units indicated becomes equivalent to the number of units of space required to fill a matrix-line, the operator commences a new line on the type-writer. Although, therefore, the lines written by the type-writer will appear of different lengths, they will, when reproduced in the second machine with appropriate spaces between the words, be of uniform length.

In the accompanying drawings I have represented my indicator as applied to an ordinary Caligraph machine, such as is now commonly sold in the market. As this machine, with its uniformly-acting feed mechanism, is familiar to every person skilled in the art, it is deemed unnecessary to illustrate its details, except in so far as they bear direct relation to my improvement.

In the drawings, Figure 1 is a perspective view of a Caligraph provided with my improvement. Fig. 2 is a side elevation of the same. Fig. 3 is a front elevation of the attachment and adjacent parts, the dial-plate being removed and a portion of the type-writer shown in section to expose other parts to view. Fig. 4 is a perspective view showing in outline the essential parts of the indicator and its connection with the key-levers of the type-writer. Figs. 5, 6, and 7 are perspective views and a side view showing the escapement mechanism in its different positions. Fig. 8 is a view illustrating the alarm mechanism. Fig. 9 is a face view of the graduated dial and the graduated pointer.

Referring to the drawings, A represents the type-writer having its printing-keys and paper-feed mechanism operated by finger-key levers B, as usual.

In carrying my invention into effect I mount on one side of the type-writer frame, in a fixed bracket or support *a*, a horizontal arbor or shaft *b*, bearing on its forward end a hand or pointer *c*, arranged to travel over the surface of a fixed dial-plate *d*, the face of which will be suitably graduated to indicate the units of space of the matrix-machine. A coiled spring *e*, fixed at one end to the arbor and at the other to the frame, constantly tends to turn the pointer and a ratchet-wheel *a'*, fixed to the shaft in rear of the dial-plate, forward in the direction indicated by the arrows in the several figures; but a dog *f*, mounted on a fixed support and acted upon by a spring *g*, engages the wheel and prevents its rotation, except as hereinafter described. The wheel and pointer are turned backward and the spring rewound, preparatory to the commencement of each line, by a cord *h*, wound upon the arbor *b* and extending downward to a finger-lever *i*, pivoted to the side of the main frame. As the wheel and pointer turn step by step, this cord is wound upon the arbor. A downward pressure upon the finger-lever causes it to unwind and turn the parts backward. The forward motion of the wheel and pointer is permitted step by step unequal distances by an escape mechanism connected to the finger-keys, which I will now proceed to describe.

The letters of the matrix-machine are com-

monly divided into five or six groups, those in each group being of equal width I therefore divide the characters of the type-writer into corresponding groups and arrange their finger-levers so that they will cause corresponding movements of the escapement and arbor, as will presently appear.

In order to limit the forward motion of the escapement-wheel and pointer when they are released from the control of the dog *f*, I provide an arm *l*, the upper end of which is in the form of a sector with a series of teeth thereon to engage the wheel, and mount this arm at its lower end on a horizontal journal *m*, seated in one end of a plate *n*, which is supported on a horizontal pivot *o*, thus allowing the arm *l* to rise into engagement with the teeth of the wheel, swing forward about its own axis *m*, and then drop out of engagement in order to return to its first position. The movement of the wheel is controlled by limiting the vibration of the arm *l* while in engagement therewith. The means for thus limiting the vibration are plainly shown in Figs. 3, 4, 5, and 6, in which *p* represents an upright arm mounted on a horizontal pivot at its lower end and provided with a stop-arm *q*, extending outward and bent laterally at one end. A series of pins *r r'*, &c., slide vertically through a projection on the side of the toothed vibrating arm *l*. They stand normally in a depressed position; but when any one of the pins is elevated it acts first on the tail end of dog *f*, thereby disengaging the dog and allowing the wheel to turn forward. As the toothed plate is at this time in engagement with the wheel, it is carried forward therewith until the elevated pin finally encounters the stop-arm *q*, as shown in Fig. 6, whereby the motion of the arm and of the wheel in engagement therewith is stopped. It will be perceived that the pin serves the twofold purpose of a trip to disengage the dog and release the wheel and of a stop to limit the motion of the parts. As the several pins are located at different points in the arm, they serve to stop the same at different points, and thus it is that the wheel and the pointer will be moved one distance if tripped by the first pin, a greater distance if tripped by the second pin, and so on throughout the series.

I will now describe the means for lifting the arm *l* into engagement with the wheel and for operating the appropriate trip-pins. The respective pins are passed through the projection *l'* on the arm *l* and jointed at their lower ends to levers D D', &c., pivoted at the side of the main frame. Each lever carries a roller *s*, and is lifted at the proper time by an eccentrically-curved arm *t*, fixed on one end of a rock-shaft E. There are as many of these shafts as there are groups of letters. Each shaft extends entirely across the machine from side to side beneath the key-levers, and has its two ends cranked and seated in the main frame, as shown in the several figures. Springs *u* tend to hold the middle portion of the shaft in an elevated position; but the finger-keys are provided with downwardly-projecting blocks *u'*, which act upon and turn the respective shafts as the key-levers are depressed to effect the printing action of the type-writer. Each key-lever acts on a single shaft only, and all keys which represent characters of the same width operate upon the same shaft. When, therefore, a key-lever is depressed to print a character, it acts to turn the appropriate rock-shaft E, which latter, through its arm *t*, raises the corresponding lever D or D'. The last-named lever in turn acts, first, on the arm *l*, to lift the same into engagement with the escapement-wheel, and the next instant, through its pivot-pin *r*, to release the escapement device, which instantly turns forward until the movement is arrested by the trip-pin encountering the stop-arm *q*. At the instant the parts have completed their forward motion, the stop-arm, being carried slightly forward with the trip-pin, pulls the arm P against the dog *f*, so that it acts with certainty to arrest the escapement-wheel.

While it is preferred to employ the stop-arm *q* and arm *p* as a means of thus operating the stop-dog *f*, it is to be understood that this is not necessary, as the stop-arm *q* may be attached rigidly to the frame and the arm *p* omitted.

When a key-lever is released, the various parts resume their original positions, the pivot-pin being lowered and the arm *l* disengaged from the wheel and thrown back to its first position by the spring *w* at its lower end.

It will be perceived by the skilled mechanic that the essential features of my invention are the escapement-wheel, the vibratory toothed arm acting therewith, the stop-pins to limit the throw of said arm, and intermediate pin-operating levers connected with the printing-keys of the machine, and it is manifest that the details may be variously modified without departing from the limits of the invention.

In order to sound an alarm when the pointer reaches a predetermined limit, I mount on the frame a stationary bell F, and provide therefor a striker G, mounted to turn and slide on a horizontal supporting-pin *x*. A pin *x'* projects from the striker into a threaded hub or nut x^2 on the arbor *b*, so that as the pointer revolves the striker is gradually shifted sidewise until finally its end is brought within reach of a projection x^3 on the arbor. When it reaches this point, the projection acts to raise the striker and allow it to fall upon the bell.

In order that the parts may be turned backward without injury to the striker, the latter is provided on its inner end with a pivoted dog or shoulder x^4, acted upon by spring x^5, which allows it to yield in a backward direction as the shoulder x^3 passes thereover. The threaded hub or nut is also utilized in connection with the elbow-lever *z* as a winding-stop.

This lever is pivoted midway of its length on the frame, and one end is engaged permanently on the threads of the nut. As the wheel revolves in winding the spring, the nut gradually shifts the lever until its lower end is finally brought in position to encounter a stop-pin on a stud z' on the wheel, so that excessive winding is prevented. When the forward motion of the threaded hub has shifted the lever to the opposite extreme, its end is brought in the path of a second stud z^2, by which the forward rotation of the wheel is properly limited.

Having thus described my invention, what I claim is—

1. In combination with the pointer, its spring-actuated arbor and the escapement-wheel thereon, the vibratory arm l, movable into and out of engagement with the escapement-wheel, a stop q, a series of stop-pins r r', &c., mounted on the vibratory arm to limit its movement, a dog f to check the escapement-wheel, and levers connecting the respective stop-pins with the respective finger-keys of a type-writer, whereby the depression of a key to effect the printing action is caused to operate one of the stop-pins, and thereby permit the advance of the escapement a greater or less distance, according to the width of the character printed.

2. In combination with the graduated dial-plate, the arbor provided with the indicator, the actuating-spring, and the escapement-wheel, the vibratory toothed arm l to engage the escapement, the vertically-movable support on which said arm is mounted, the spring to retract the arm, the stop-arm g, the series of stop-pins r r', &c., carried at one end thereby, the levers D D′, &c., the rock-shafts having arms to operate the respective levers D, and the type-writer finger-keys arranged to actuate the rock-shafts.

3. In combination with a dial, a pointer, and a variable escapement to control the pointer, the type-writer having its printing-keys divided into groups representing characters of different widths, the rock-shafts operated respectively by keys of the several groups, and connections from the rock-shafts to the escapement to move the same different distances.

4. In combination with the printing-key of a type-writer, a cranked rock-shaft on which it acts, an eccentric arm on the end of said shaft, a lever D, acted upon by said arm, a stop-pin carried by the last-named lever, a vibratory and vertically-movable arm l, in which the stop-pin is mounted, a spring to return the arm, a spring-actuated toothed wheel c, and a dog g to hold the wheel in check, whereby the depression of the printing-key is caused to effect the movement of the wheel.

5. The escapement mechanism comprising the peripherally-toothed wheel, a spring to turn the same forward, a vibratable arm l, provided with a series of teeth on its end and mounted to be thrown into and out of engagement with the wheel, the spring to swing the arm back when disengaged, the dog to hold the wheel, the stop-pins r r', &c., to disengage the dog, and a stop against which the active pin is carried to arrest the forward motion of the arm and wheel.

6. The toothed wheel, the spring to turn the wheel, and the dog f to prevent its rotation, in combination with the vibratory toothed arm l, movable into and out of engagement with the wheel, its retracting-spring, the stop-pins r r', the stop-arm q, and its sustaining-lever p, arranged to act upon dog f.

7. In combination with the arbor and its indicator, the bell, the bell-striker mounted to slide laterally, the screw on the arbor to cause the lateral motion, and the shoulder to actuate the striker.

8. In combination with the arbor, the screw and the wheel thereon, and the lever z, engaging the screw, and movable thereby to engage the two stops on the wheel alternately.

In testimony whereof I hereunto set my hand, this 6th day of June, 1889, in the presence of two attesting witnesses.

WILLOUGHBY W. STREET.

Witnesses:

LUTHER WHITE,

LEWIS W. FERRY.