

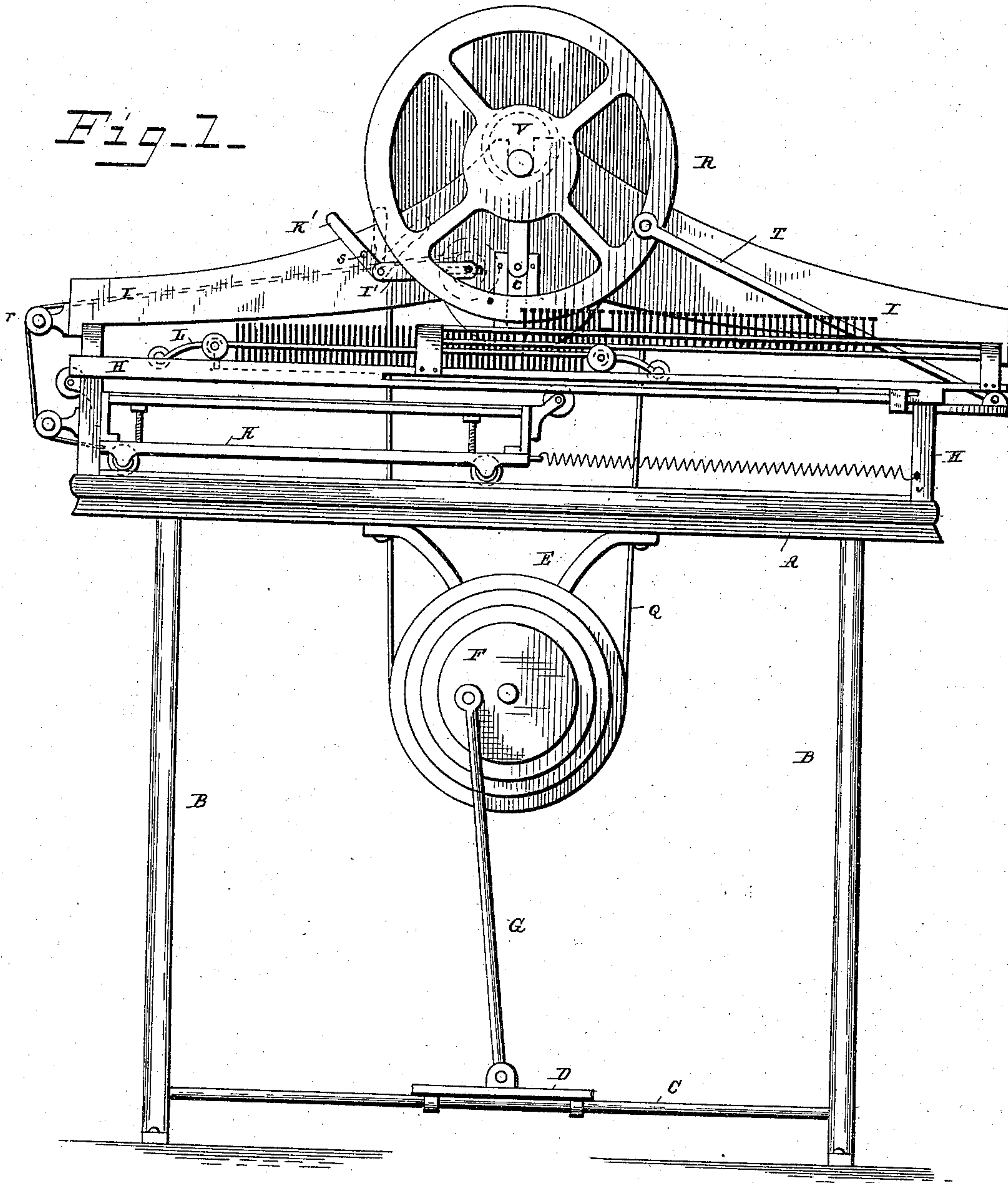
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4 Sheets—Sheet 1.

T. D. WORRALL.
TYPE WRITING MACHINE.

No. 335,669.

Patented Feb. 9, 1886.



WITNESSES

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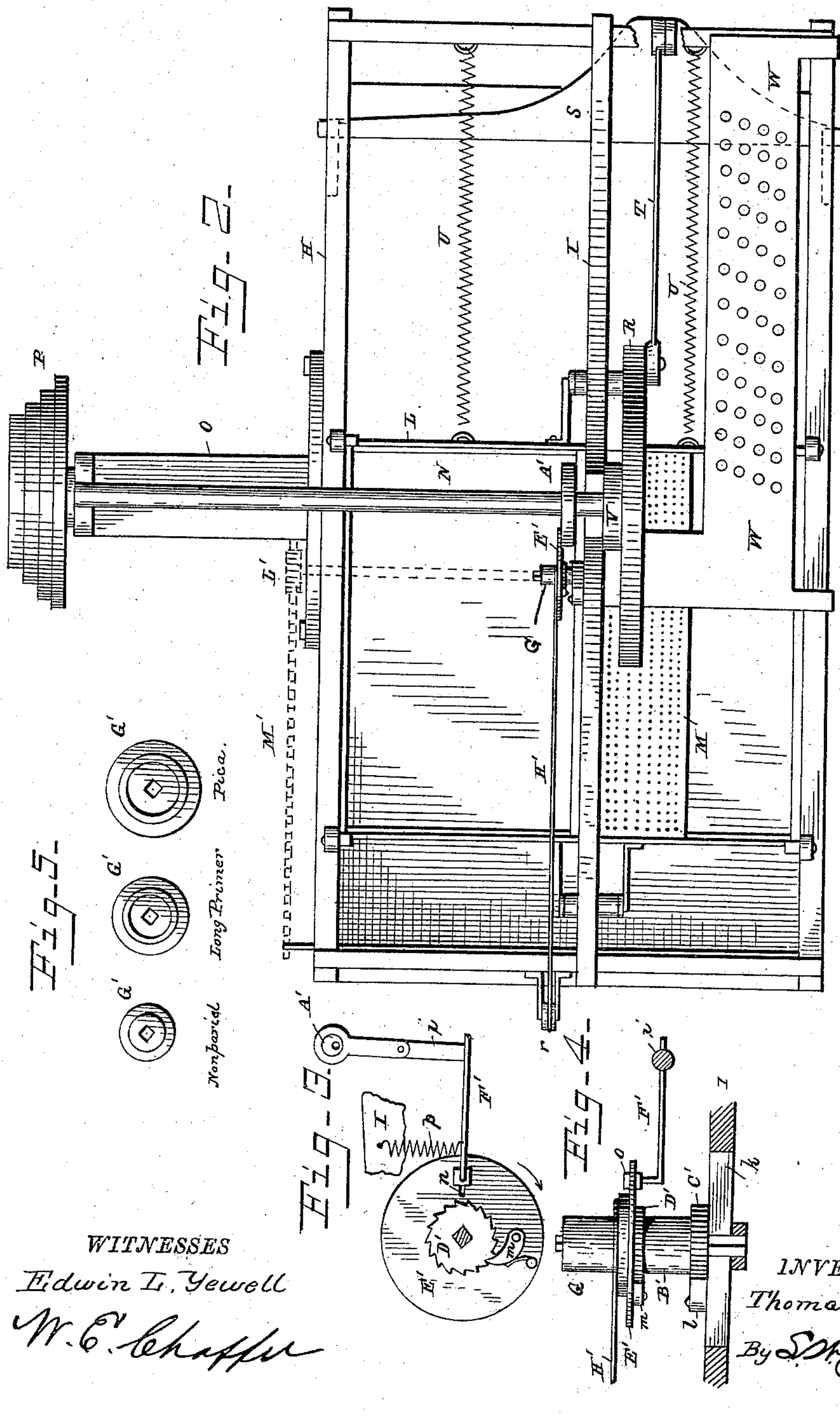
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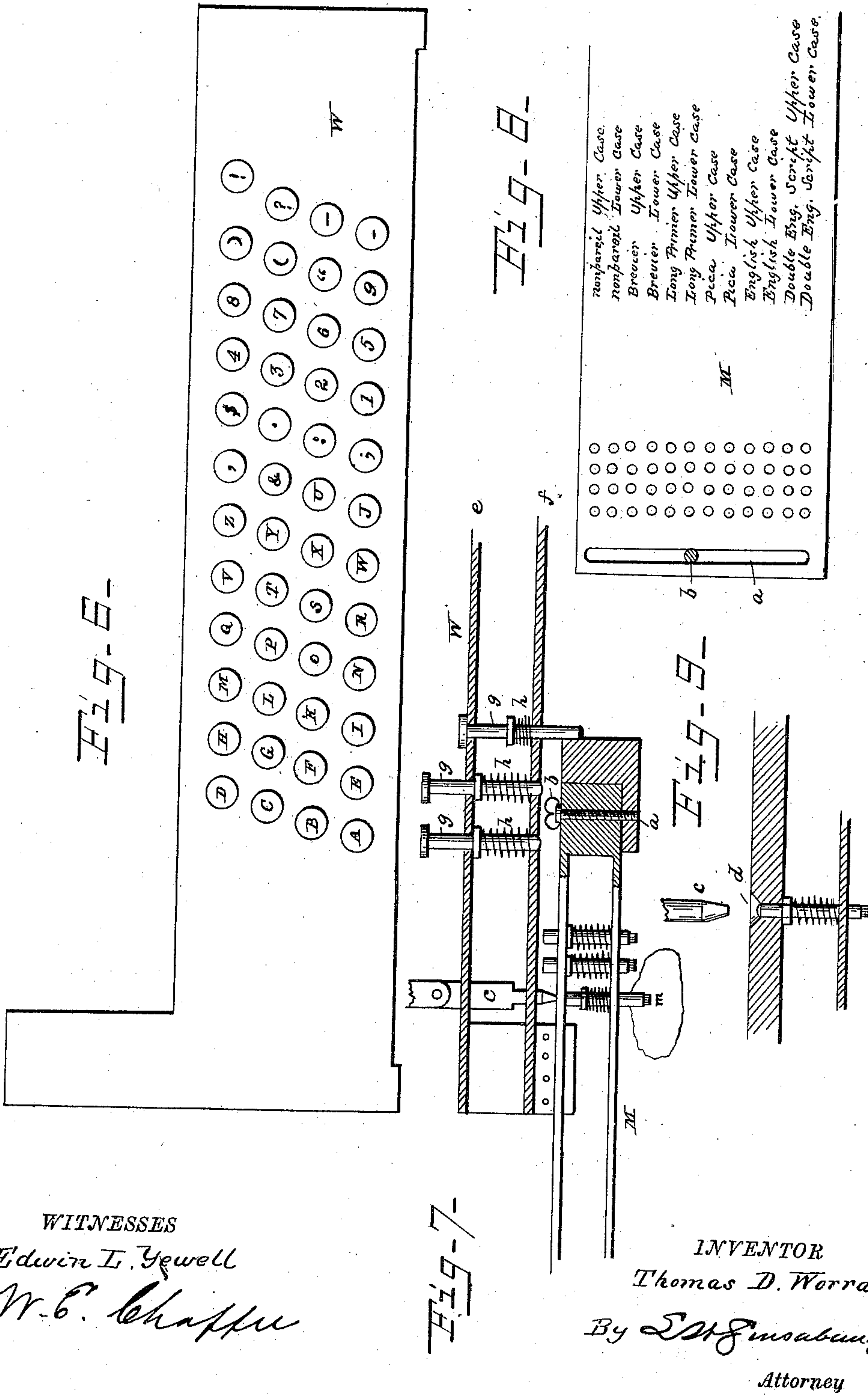
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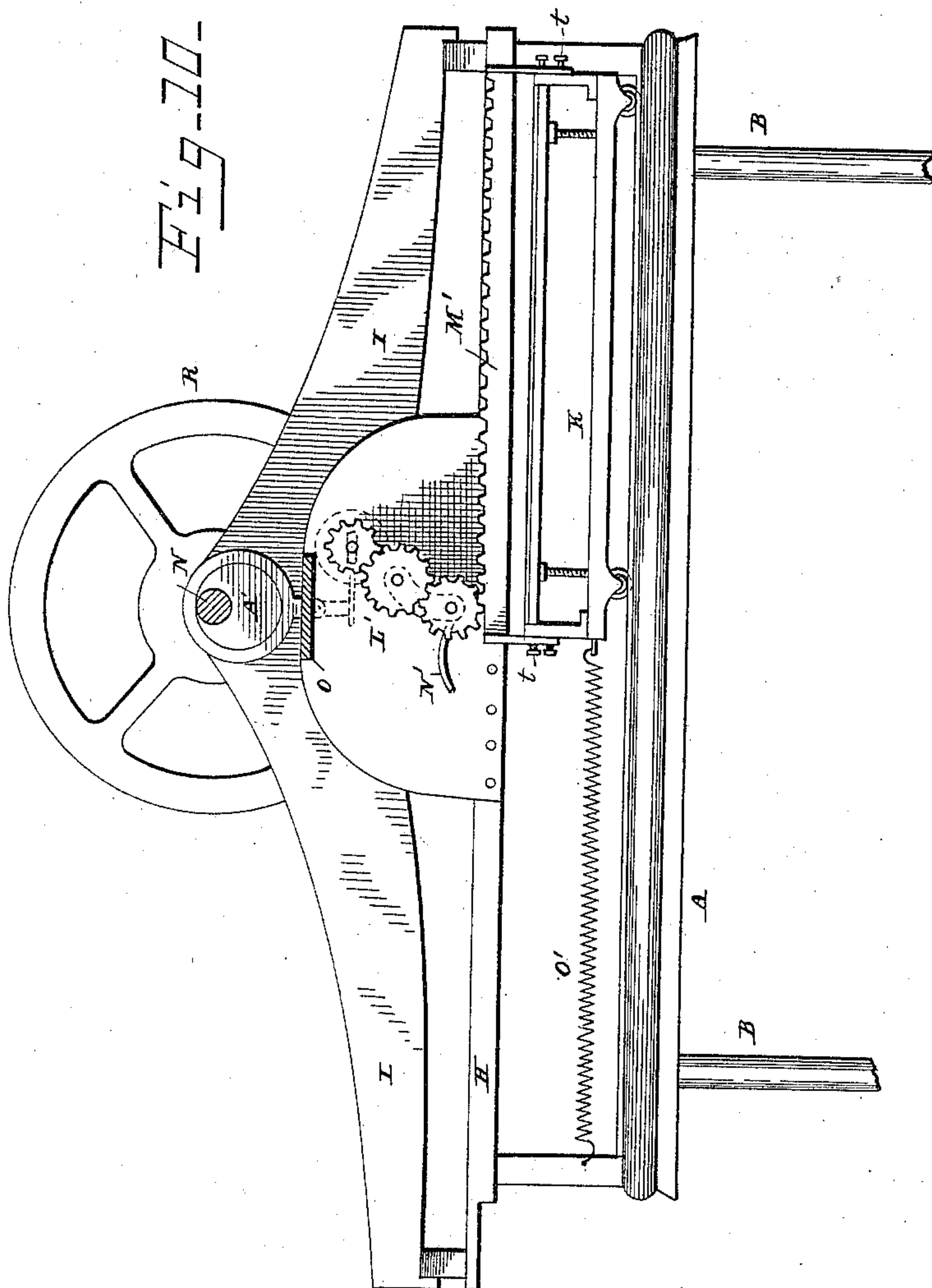
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UNITED STATES PATENT OFFICE.

THOMAS D. WORRALL, OF WASHINGTON, DISTRICT OF COLUMBIA.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 335,669, dated February 9, 1886.

Application filed March 30, 1885. Serial No. 160,618. (No model.)

To all whom it may concern:

Be it known that I, THOMAS D. WORRALL, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in type-writing machines.

The object of my invention is to provide a type-writing machine in which the type-holding frame, the devices for moving the paper-bed, and the piston or bar for depressing the type-pin are driven by a continuously-rotating shaft or other power-driven device.

Referring to the drawings, Figure 1 is a front elevation of my improved machine. Fig. 2 is a top or plan view. Fig. 3 is a detached side view of the disk, ratchet-wheel, pawl, and other operating parts for moving the paper-carriage. Fig. 4 is a top or plan view of the devices shown in Fig. 3. Fig. 5 is an end view of the movable or interchangeable drums on which the cord or chain for moving the paper-carriage is wound. Fig. 6 is a top or plan view of the frame or plate which holds the stop-pins. Fig. 7 is a detached sectional view of the type-carrying frame and the stop-pin frame, showing one of the stop-pins depressed, and also one of the type-pins in printing-contact with the paper. Fig. 8 is a top or plan view of the type-holding frame, having a slot therein to receive a fastening device, and also showing fonts or batteries of different kinds of type. Fig. 9 is a sectional view of the type-carrying frame, with a conical recess therein for centering the impression-piston. Fig. 10 is a rear view of my machine, showing a modification of the devices for operating the paper-carriage.

A is the top of the table, provided with suitable legs or supports, B, and a cross-bar, C, to which the treadle D is secured, as in the ordinary sewing-machines.

E is a bracket secured to the under side of the table A, in which the band pulley or wheel F is mounted, and is connected to the treadle D by means of the rod G. The band-pulley F is composed of a series of disks of different diameters, in order that a variable speed may

be imparted to the operating mechanism, as will more fully appear hereinafter.

H is a frame rigidly secured to the top of the table A, and to which is fastened the cross-bar or bracket I.

K is the paper-carriage, mounted on suitable wheels, and adapted to be moved back and forth in ways or tracks secured to the top of the table A.

L is the type-carrying frame, mounted on suitable wheels, and adapted to be reciprocated back and forth in ways on the top of the frame H by devices which will be fully described hereinafter.

The type-carrying frame L is adapted to receive type-holding frames M, containing one or more fonts or batteries of type of different sizes or styles, and said type-holding frames are provided at each end with slots *a*, to receive a thumb-screw, *b*, secured in the type-carriage, by which means the type-holding frame can be moved back and forth in the type-carriage, and be adjusted at any desired point, so as to bring the proper font or style of type under the impression hammer or piston.

The type-holding frame M and devices for holding the type-pins therein, together with the paper-carriage, are essentially of the same construction as those shown, described, and claimed in an application filed by me March 23, 1885, Serial No. 159,815, and need no further description in this connection.

N is a shaft, one end of which is mounted in suitable bearings in the bracket or cross-bar I, while the other end is supported in bearings in the bracket O, and is provided with a speed or cone pulley, P, which is connected to and receives motion from the cone-pulley F by means of the band or belt Q.

R is a wheel secured to the front end of the shaft N, and is connected to the cross-head S by means of the pitman or rod T, said cross-head being adapted to slide in ways in the frame H and drive the type-carriage forward at each revolution of the wheel R, the type-carriage being drawn back as soon as released from the pressure of the cross-head by means of the springs U, and following the cross-head back until stopped by a pin depressed for the purpose. The shaft N is provided with an

eccentric disk or wheel, V, which is connected to the bar or piston C in the usual manner, the bar or piston being adapted to slide in ways formed in bracket or cross-bar I. The office or function of the bar or piston C is to depress the type-pins brought under it and to bring them into printing-contact with the paper, the lower end of the piston or bar when depressed being the printing or impression point. The lower end of the impression bar or plunger C is made tapering, to register with a tapering or cone-shaped recess, *d*, in the top plate of the type-holding frame, and by this means said type frame is centered before the final pressure is exerted on the type-pins. (See Fig. 9.)

W is a frame, consisting of upper and lower perforated plates, *e* and *f*, secured on top of the frame H, and is provided with a series of spring-seated pins, *g*, corresponding in number, but in reverse arrangement, with the type-pins in the fonts or batteries in the type-carrying frame. The office or function of the pins *g* is to stop the type-carriage in its backward movement, by which means the corresponding letter is brought under the impression pin or piston C. This is effected by simply pressing down on the proper key and holding the same in its depressed position until the type-carriage has reached it and the impression has been made by the type, and when the pressure of the finger of the operator has been removed from the stop-pin *g* it will be raised by the coiled spring *h* to its elevated position as the cross-head again returns to move the type-carrying frame forward.

I will now describe the the devices by which the paper-carriage is automatically fed forward to space the letters and present a fresh printing-surface to the type.

A' is an eccentric disk or wheel secured to the shaft N on the rear side of the bracket or bar I. This eccentric is placed in a reverse direction from the eccentric V, so that when the eccentric V is in its lowest position and exerting its power on the type-pins the eccentric A' will be at its highest or elevated position, and vice versa. The eccentric A' is provided with the usual ring or band connection, which is pivoted to the bar or plunger *i*, as shown in Fig. 3, said bar or plunger *i* being adapted to slide in ways formed in the rear portion or side of the bracket or cross-bar I.

B' is a shaft supported in a slot, *k*, formed in the bracket or cross-bar I, and is adapted to be adjusted at any desired point in said slot.

C' and D' are ratchet-wheels secured to the shaft B', the ratchet C' being held from moving backward by the retaining-pawl *l*.

E' is a disk loosely mounted on the shaft B' and carries a pawl, *m*, which meshes with the teeth of the ratchet-wheel D'. The disk E' is provided with a slot, *n*, to receive the enlarged flat end *o* of the lever F', said lever F' being supported by the spiral spring *p*, the

upper end of which is secured to the bracket or cross-bar I.

G' is a reel or drum, to which is secured one end of the chain or cord H', said chain or cord being passed over the pulley *r*, secured to the frame H, the other end of the chain or cord being secured to the paper-carriage K. It will be noticed that as the lever F' is depressed by the bar *i* the disk E' and shaft B' will be turned in the direction of the arrow one or more notches, carrying the ratchet D' and shaft B' with them, thus winding the cord or chain on the drum G' and moving the paper-carriage the proper distance to space the letter, the pawl *l* serving to hold or retain the shaft in such advanced position. On the upward stroke of the bar or plunger *i* the lever F', being released from the pressure of said plunger, will be drawn up by the spring *p*, and the pawl *m* drawn back over one or more notches of the ratchet D', and into proper position to move the shaft B' one or more notches as the bar or plunger again descends.

In order to secure a variable feed of the paper-carriage and to properly space for types of different size of a given font, I mount the shaft B' in a yoke, I', which is pivoted to the lever K', and adapted to slide back and forth in the slot *k*, and is operated by the said lever K', which is pivoted to the bracket I at *s*. It will be noticed that as the disk E', with its operating-lever F', is brought closer to the reciprocating bar *i* the greater will be the movement or swing of the lever and disk, and that the ratchet-wheel D' and shaft B' will be moved around the distance of several notches or teeth, thus moving the paper-carriage the desired distance to space the large or wide letters properly. This position is shown in Fig. 1, while in Fig. 3 the bar *i* is shown as impinging on the outer end of the lever F', and tends to move the disk and shaft around the space or distance of one notch, and thus effect a slight movement of the paper-carriage and space for the smaller letters.

The position of the lever K' to effect the spacing of different-sized letters is indicated by dotted lines in Fig. 1. The movement of the paper-carriage to suit letters or characters of different size may also be effected by having the hollow drums or thimbles G' of larger or smaller diameter, as indicated in Fig. 5, and by adapting them to be readily applied to the drum G as occasion may require I am enabled to increase or diminish the distance to be traveled by the paper-carriage at every turn or partial turn of said drum or reel. A very small drum or reel would be required for diamond or nonpareil, and a much larger drum for pica or great primer. To meet this demand I do not change the drum to which the cord or chain is attached, but simply slip the hollow drum or thimble of desired size on the drum and under the cord or chain.

Another equally effective, but more expensive, method of operating the paper-carriage to

effect the spacing is that of a rack and pinion applied to the double ratchet, as seen in dotted lines, Fig. 2, and more clearly illustrated in Fig. 10. In this case the shaft B' of the
5 double ratchet is extended to the back part of the machine, and is provided with a pinion-wheel, L', which meshes with the rack-bar M', attached to the rear of the paper-carriage.

To regulate and vary the spacing, I either
10 make an interchange of wheels and raise or lower the rack by means of the set-screws *t*, so as to mesh with them, or make a multiple rack—such as is described and claimed in my former application, above referred to—or,
15 which I consider as more accurate, I make use of a set or sets of adjustable gears, as shown in Fig. 10, and to return the paper-carriage to start a new line of printing, the wheels are thrown out of gear by the lever N', and the
20 paper-carriage is drawn back by the recoil of the spiral springs O'.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

25 1. In a type-writing machine, the combination of a reciprocating type-carrier, a continuously rotating shaft, and intermediate mechanism, such as described, for moving the type-carrier in one direction, and springs for
30 drawing it back to the printing or impression point, as set forth.

2. In a type-writing machine, the combination, with a reciprocating type-carrier, of a power-driven cross-head for moving it in one
35 direction, springs for returning it, and a plate carrying stop-pins, as described, whereby the type-carriage is stopped with the proper letter or type at the printing point or center, as set forth.

40 3. In a type-writing machine, a reciprocating

type-carrier operated by a power-driven shaft, as described, and an impression bar or piston for depressing the type-pins, operated from the same shaft, as set forth.

4. In a type-writing machine, the combination, with a reciprocating type-carrier, of a power-driven cross-head for moving it in one direction, springs for returning it, a plate carrying stop-pins, and an impression bar or piston, C, driven from the main power-shaft, 50 as set forth.

5. In a type-writing machine, the shaft N, provided with the eccentric A', secured to the sliding bar *i*, as described, in combination with the lever F', disk E', having pawl *m*, 55 ratchet D', secured to the shaft B', carriage K, and cord H', whereby the shaft B' is moved one or more notches at each revolution of the shaft N, as set forth.

6. The adjustable shaft B', carrying the 60 disk E' and lever F', in combination with the reciprocating bar *i*, and spring *p*, whereby the rotary movement of the shaft is regulated by the distance of said shaft from the sliding bar.

7. In a type-writing machine, the adjustable 65 shaft B', provided with the drum G', and operated by devices, substantially such as described, in combination with the cord or chain H' and paper-carriage K.

8. In a type-writing machine, the shaft B', 70 fitted to receive hollow drums or thimbles of varying diameter, and operated as described, in combination with the paper-carriage and cord, as and for the purpose set forth.

In testimony whereof I affix my signature 75 in presence of two witnesses.

THOS. D. WORRALL.

Witnesses:

GEO. M. LOCKWOOD.

WM. H. DELACY.