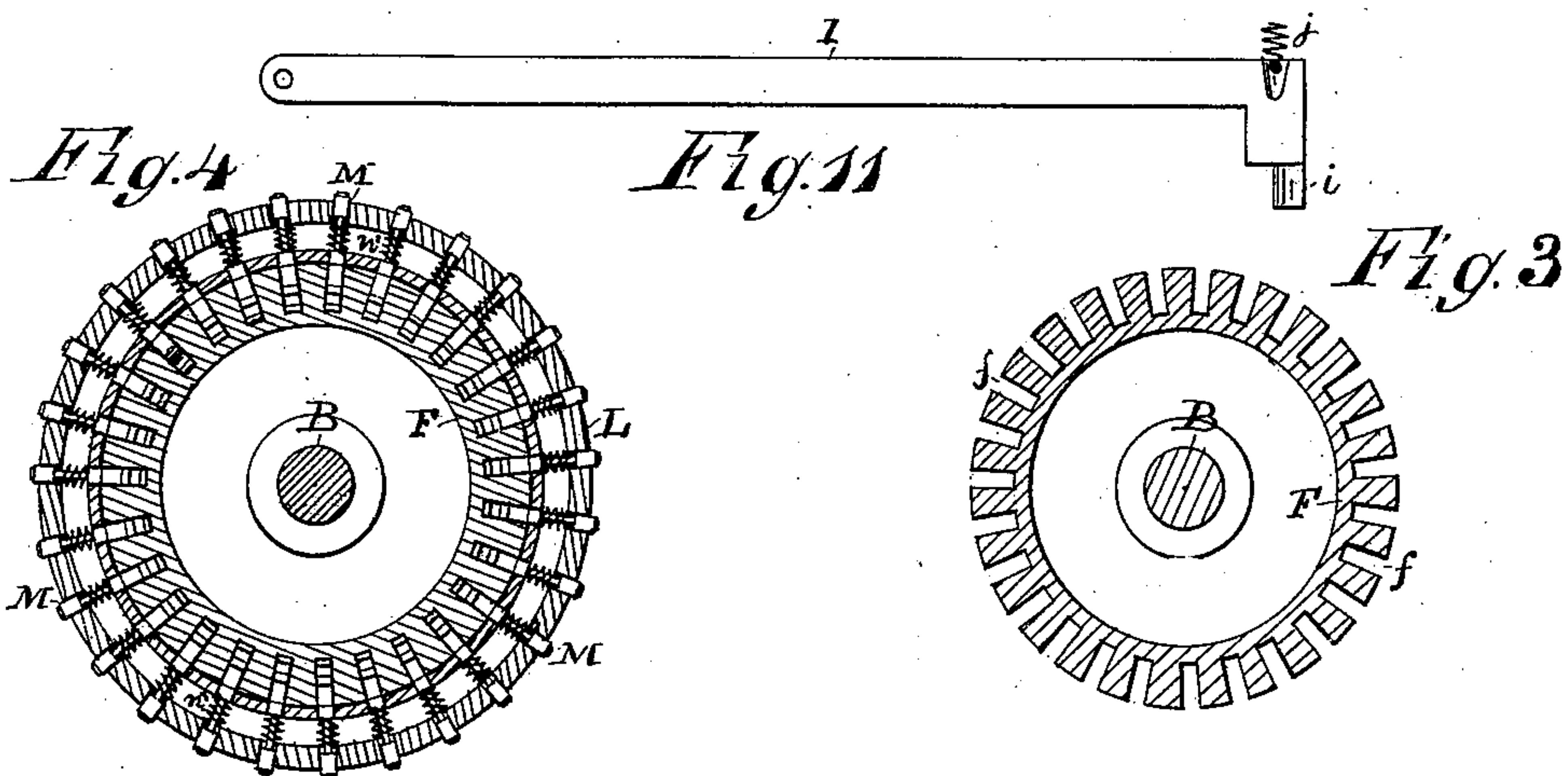
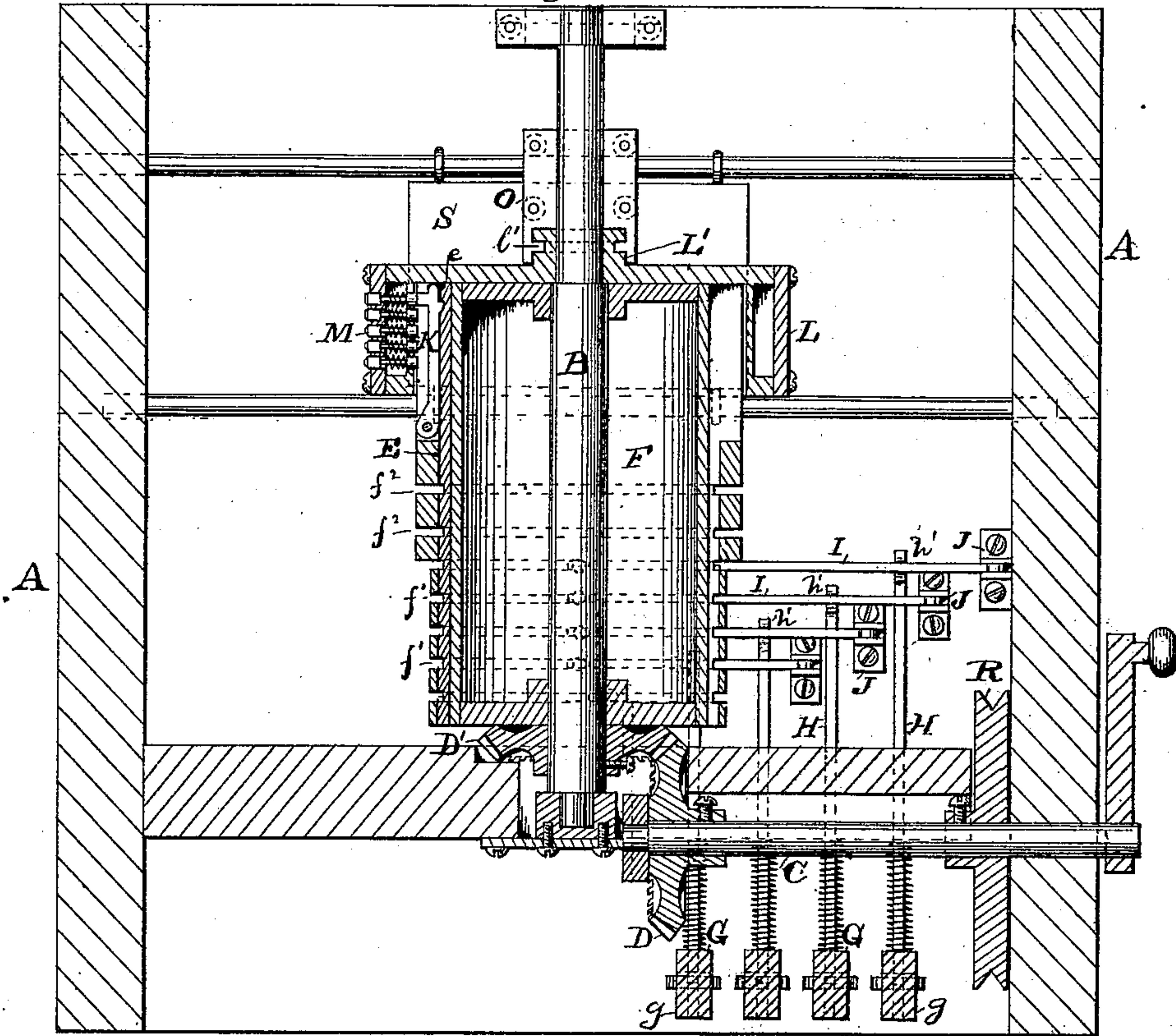


G. H. MORGAN.
TYPE WRITING MACHINE.

No. 181,463.

Patented Aug. 22, 1876.

Fig. 1



Witnesses.
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R. Hannay

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Fig. 2

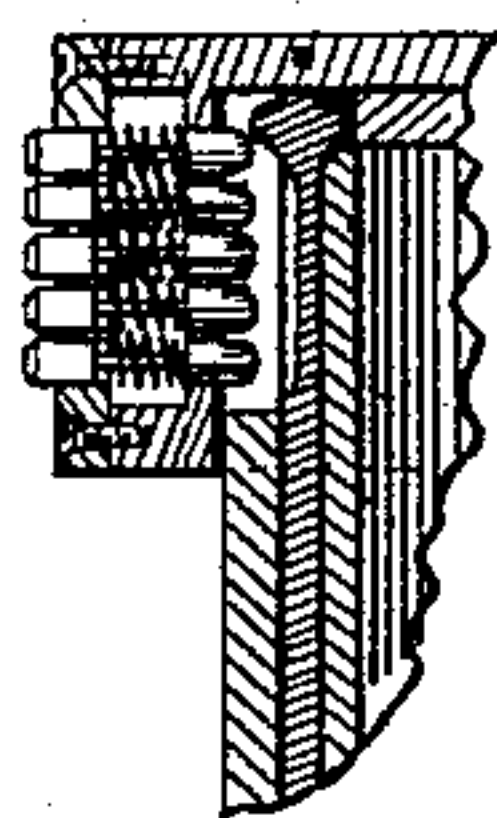
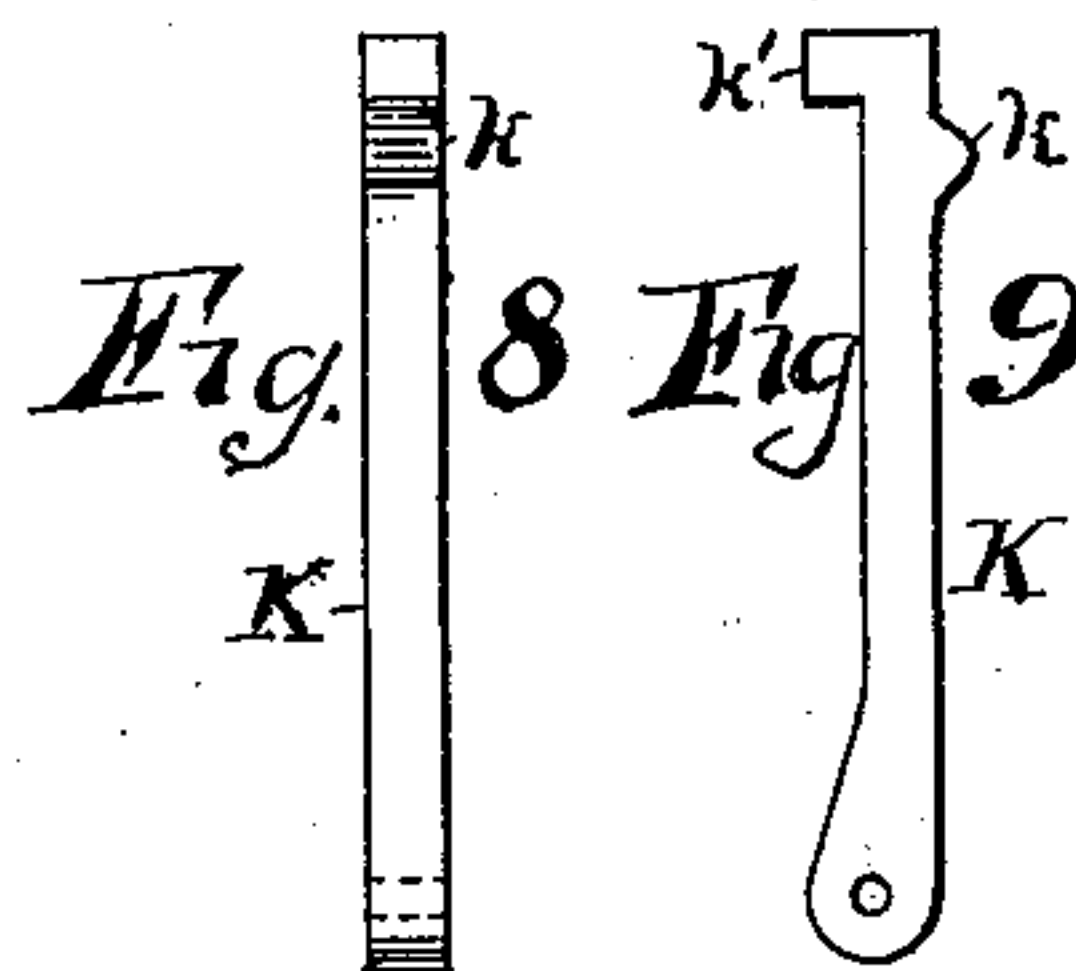
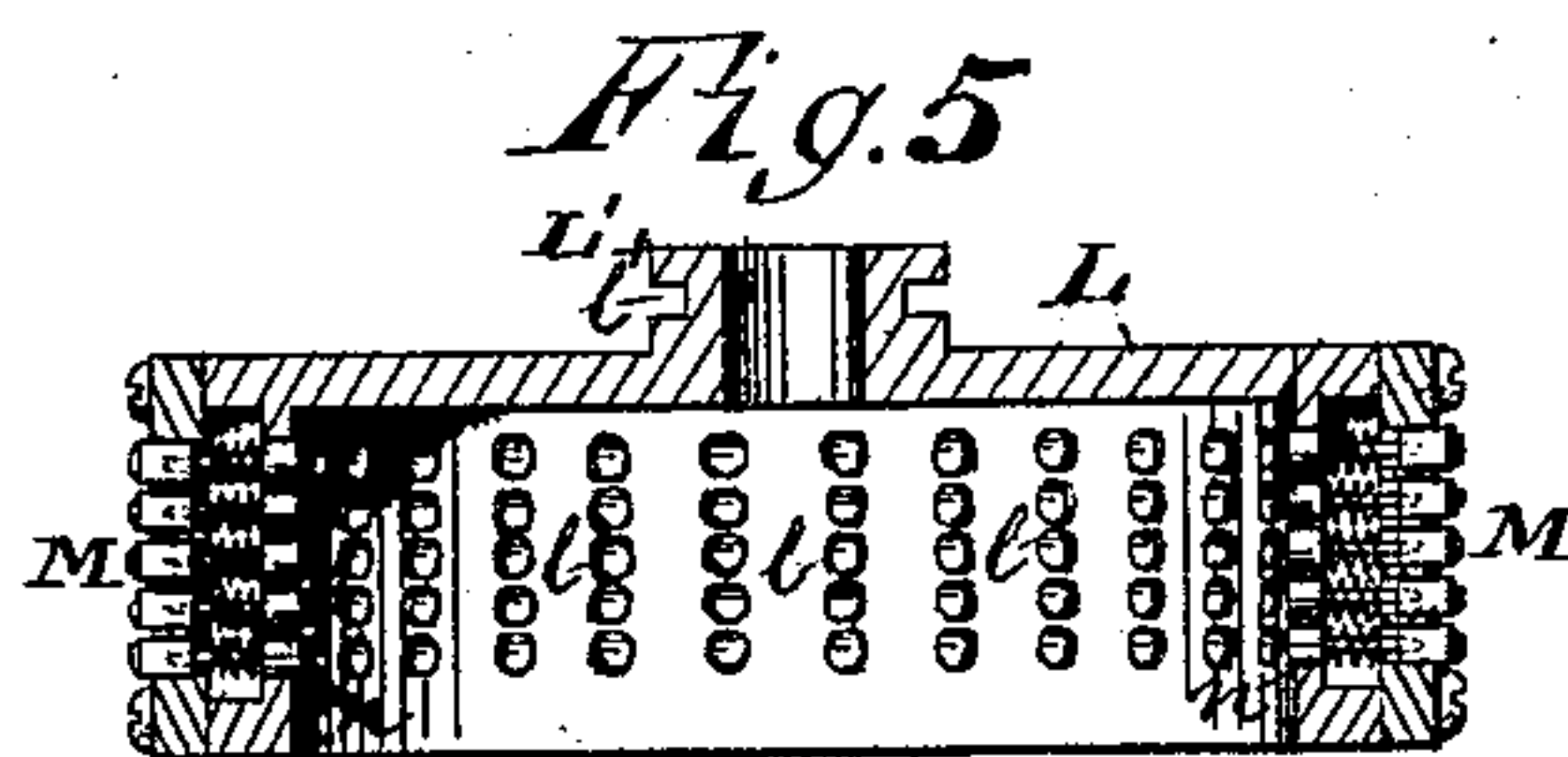
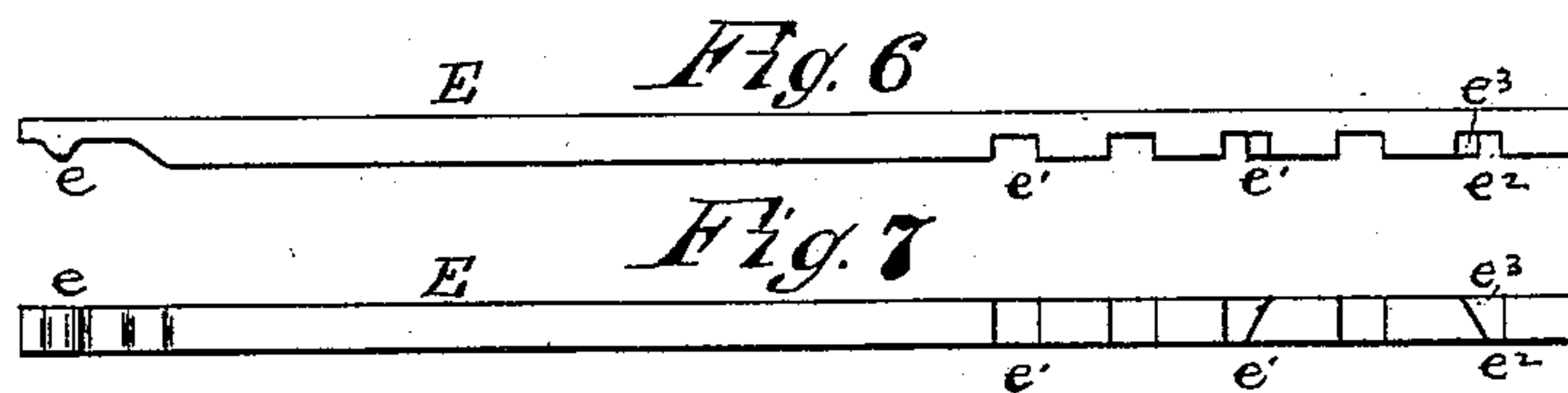
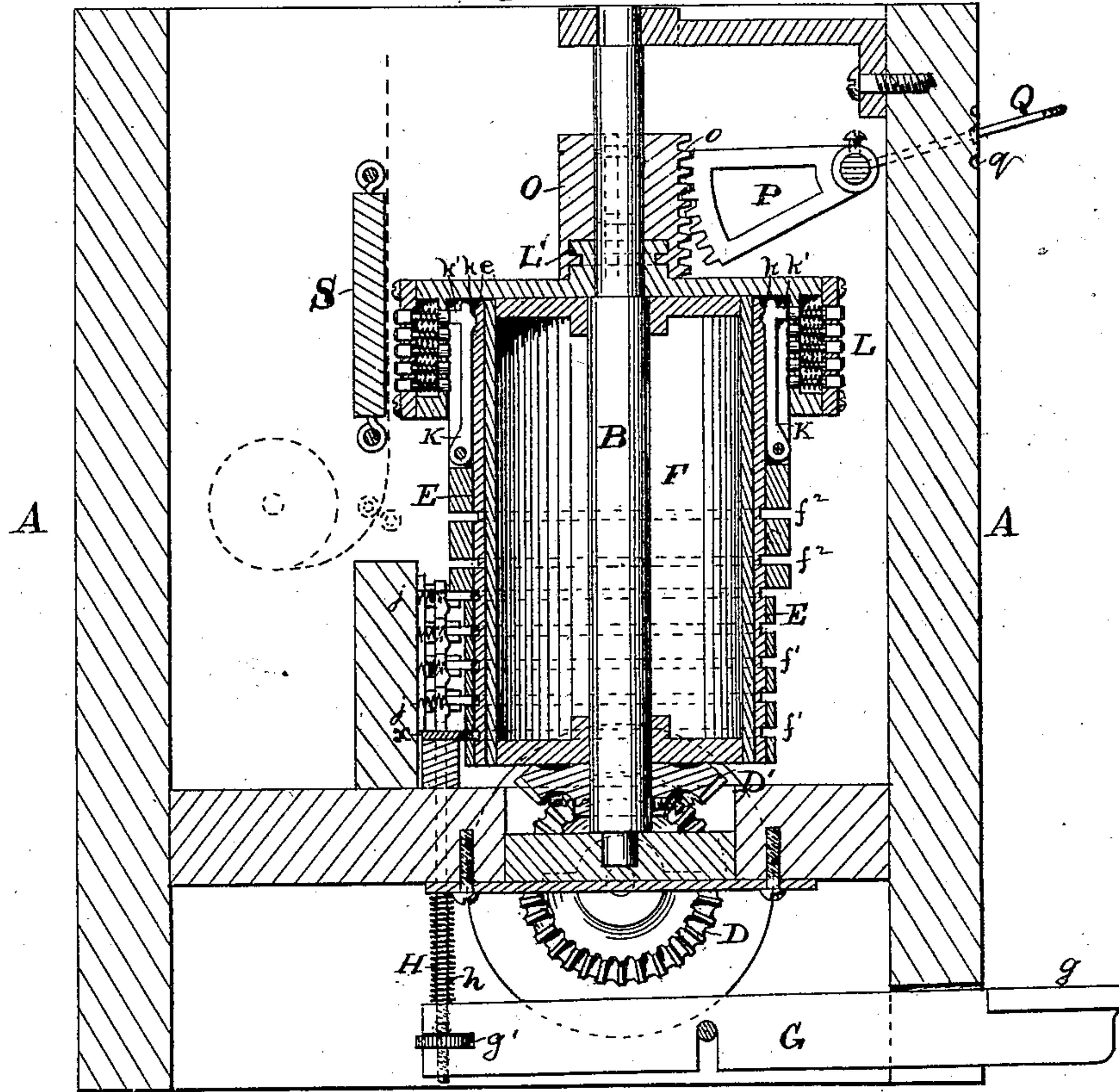


Fig. 12.

Witnesses
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G. H. Morgan

UNITED STATES PATENT OFFICE.

GEORGE H. MORGAN, OF ALEXANDRIA, VA., ASSIGNOR TO TYPOGRAPHICAL MACHINE PRINTING COMPANY, OF THE DISTRICT OF COLUMBIA.

IMPROVEMENT IN TYPE-WRITING MACHINES.

Specification forming part of Letters Patent No. **181,463**, dated August 22, 1876; application filed February 5, 1876.

To all whom it may concern:

Be it known that I, GEORGE H. MORGAN, of Alexandria, in the county of Alexandria and State of Virginia, have invented certain new and useful Improvements in Type-Writing Machinery; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The invention relates to a new and improved type-writing machine, by means of which the alphabetical characters of words are printed in ordinary text, with due regard to their difference in size, and the space which they occupy—*i. e.*, properly spaced, or with proper spaces between the letters of each word, and between the words themselves, and with mechanism so arranged that the spaces between the letters of each word, and between the words themselves, may be more or less increased as the occasion requires.

In another machine I accomplished this result by means of a revolving type-wheel carrying a series of independent and adjustable type-carriers, each having a single letter in different styles of type, arranged so as to receive a back-and-forth movement at the will of the operator, so that the type required to be printed is presented to the action of a printing-hammer at the right moment.

In this machine I accomplish the same result by means of a type-wheel, also; but the types are not arranged upon independent and adjustable type-carriers, but are inserted radially in a revolving wheel, the letters of the different alphabets or styles being inserted in parallel circles, each style in its own circle—that is to say, all the capitals of the same style in one circle; all the common text-letters of the same style in another circle, italics in another, and so on, each different style or size of letter having a circle of its own, and so that each letter in its different styles shall run in a line parallel with the axis of the wheel. Said improved wheel is made adjustable, so as to bring the desired style of type opposite a fixed

point where the required type is made, through suitable means, to receive an impulse or motion which brings it in contact with the paper to be printed. The invention further consists in a new and improved mechanism for operating this new type-wheel, said mechanism being hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a vertical sectional view of a machine embodying my improvement. Fig. 2 is a side view of the same, also in vertical section. Fig. 3 is a plan view of the cylinder in section. Fig. 4 is a plan view of the type-wheel and cylinder, also in section. Fig. 5 is a vertical sectional view of the type-wheel, detached. Figs. 6 and 7 show the detached view of the sliding cam-rods. Figs. 8 and 9 are detached views of the type-moving levers. Fig. 10 is a detached view of the type, the stem of the type, and the spring for returning the type to its normal position. Fig. 11 is a detached view of one of the cam-rods.

Referring to the parts by letters, A represents the frame-work to which the parts of the machine are journaled, or otherwise suitably attached. B represents a vertical shaft journaled in suitable bearings in the frame A, and C is a horizontal shaft suitable to a journal in the frame A, by means of which motion is imparted to the machine, any suitable power being applied. D and D' are beveled gear-wheels keyed upon the shafts C and B, respectively, through which the motion is transmitted. F is a cylinder keyed to the shaft B, so as to revolve with it. The upper portion of the cylinder F is made of greater diameter than the lower, and the whole is formed with a series of longitudinal grooves, *f*, which extend throughout its length. A series of circumferential grooves, *f*¹, are also formed in the periphery of the lower portion of the cylinder F. The two upper of these circumferential grooves *f*² are formed on the portion of the cylinder having the greatest diameter. E represents a series of rods having cams *e* on their upper ends, and a series of grooves, *e*¹, corresponding in number with the circumferential grooves in the cylinder. The end groove *e*² has a beveled face or cam, *e*³. G represents a series of pivoted bars, the outer ends of

which are formed into finger-keys *g*. *H* represents a series of rods or vertical bars corresponding in number with the keys *g*. The lower ends are screw-threaded, and passed through slots in the bars *G*, and provided with adjusting-screw wheels or nuts *g'*. *h h* represent spiral springs, which encircle the lower ends of the bars *H*. The upper ends of these bars have each a cam or projection, *h'*. *I* represents a series of horizontal rods or bars, having projecting ends, provided with keys or cams *i*. These rods are pivoted to adjustable brackets *J*, secured to the frame of the machine, and are provided with springs *j*. The keys *G*, rods *H*, and cam-bars *I* correspond in number with the circumferential grooves in the lower part of the cylinder, and operate the rods *E*, in the manner hereinafter more fully set forth. *K* represents a series of levers pivoted at the lower ends in the longitudinal grooves formed in the upper part of the cylinder. They also correspond in number with the rods *E*, cam-bars *G*, rods *H*, and keys *g*. On the inner side of the upper end these levers *K* have a cam-projection, *k*, and on their other side a projection or key, *k'*. *L* represents the type-wheel loosely mounted on the shaft *B*, and made so as to fit over a portion of the upper end of the cylinder *F*, as shown in the drawings.

It is formed with a number of series of radial slots, *l*, arranged in parallel lines, as clearly shown in Fig. 5 of the drawings.

M represents the type, and *N*, type-shaft, having a head or projection, *n*, on its inner end. *n'* represents spiral springs placed around the stem *N*, which bear against the inner side of the outer plate of the type-wheel, and against the head *n*. These type, with their stems and springs, are inserted in the slots *l* in the wheel. The wheel *L* has a central projection, *L'*, on its upper side, formed with a circumferential groove, *l'*.

O is a sleeve, which may be made in two pieces and clamped together, and loosely mounted upon the shaft *B*. It has an annular key-ring, which fits the groove *l'*. One side of this sleeve *O* is formed into a rack-bar, *o*. *P* represents a segmental gear pivoted to the frame of the machine, and having teeth which engage with the rack-bar *o*. *Q* is a lever, one end of which is secured to the pivotal shaft of the gear *P*, and its other end passes out through the side of the machine, upon which is formed a series of notches, *q*, or other means for securing the end of the lever in the desired position. *R* is a band-wheel on the shaft *C*.

I have not shown any device for carrying or feeding the paper in this specification; but the grooves *f*² on the enlarged upper portion of the cylinder *F* are designed for the reception of the ends of cam-levers, which actuate mechanism for operating the paper-carriage, the paper being fed as indicated by dotted lines in Fig. 2 of the drawings, *S* being a fixed plate or platen, against which the paper is

pressed by the type in the operation of printing.

The paper-carriage and mechanism for operating the same will form the subject of another application for Letters Patent, for which I am about to apply.

The operation of the machine is as follows: Motion being imparted to the shaft *C* by any suitable power, and the miter-wheels *D D'* gearing with each other, the cylinder and type-wheel will be rotated at the same rate of speed, the sleeve *O* remaining stationary, and the ends of the cam-bars *I* being held clear of contact with the rods *E* by means of the springs *j*. When it is desired to print with the machine the type-wheel *L* is adjusted up or down on the shaft *B* by means of the lever *Q*, segment *P*, and rack *o* of the sleeve *O*, so as to bring the head of the required type or style of type in its circle, to be printed, directly opposite to the projections *h'* on the upper end of the levers *K*. The desired style or size of type will now be in a position for printing. The operator then presses upon the key representing the letter to be printed, depressing the key end of the bar *G*, and raising the end to which the rod *H* is attached, thereby forcing the latter upward, so that the projection *h'* on its upper end will press upon the corresponding cam-bar *I* until its key or cam *i* comes in contact with the beveled face of the rod *E*, pulling the latter down, so that the projection or cam *e* on the upper end of the rod *E* will operate upon the projection *k* on lever *K*, and force the projection *k'* against the head of the type, so as to move the type outward against the paper.

The intermediate lever *K* may be dispensed with, and the rod *E*, through its cam *e*, made to act directly on the inner end of the type, the stem of the type being suitably constructed for the purpose, and made to project through an annular stay-plate on the inside of the type-wheel; but I prefer to use the intermediate lever *K* in connection with rod *E*.

After the letter has been printed the stationary cam or plate *x* will come in contact with the beveled face *e*³ as the cylinder revolves, and push the rod *E* up again, so that the cam *e* will pass above the cam *k* and permit the type to come back to its normal position through the operation of the spiral spring *n*.

In doing this it will have forced the type out again, but at a time when it will not come in contact with the paper. As the type-wheel revolves the type come in contact with the inking-roller before coming to the printing-point, and the paper moves at the required rate of speed from right to left, it being operated by suitable mechanism, receiving motion from cam-levers, the ends of which project into grooves *f*², as before described, so that the rods *E* will actuate the said levers at the same time that they operate the levers for forcing out the type. In this way the same

mechanism moves the paper and prints the letter at one and the same time.

The second outward movement of the type, caused by the return or upward movement of the rod E, may be utilized to press the type against the inking-roller.

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

1. A revolving type-wheel, L, having a back-and-forth movement on its shaft, and having the same letters, in different styles or sizes of type, arranged circumferentially in parallel circles, the letters of each style or size being confined to their own circle, and each type capable of independent movement, for the purposes specified.
2. A revolving type-wheel, L, having different styles or sizes of type, arranged as described—that is to say, circumferentially in parallel circles, the letters of each style or size being confined to its own circle, each letter or type being actuated independently of the other, substantially as specified.
3. A revolving type-wheel, L, having different styles or sizes of type, arranged as described—that is to say, circumferentially in parallel circles, the letters of each style or size being confined to its own circle and capable of being adjusted so as to bring any desired style or size of type in a line with actuating printing mechanism, arranged to operate within the wheel, substantially as and for the purpose specified.
4. The type-wheel L, having two or more series of radial slots, *l*, arranged circumferentially and radially, as described, in combination with corresponding series of movable type M, each series comprising a different style or size of type from those of the other series, substantially as and for the purpose specified.
5. An adjustable type-wheel, L, carrying two or more series of independently-moving type, in combination with a hand-lever, substantially as described, for adjusting the same, as and for the purpose specified.
6. The type-wheel L, having the central projection L', with groove *l'*, operating in combination with the sleeve O and segment-gear P, substantially as and for the purpose specified.
7. The combination of a sliding revolving type-wheel, L, with a revolving cylinder, F, carrying the type-operating mechanism, in such manner that the former shall encircle the end of the latter and be capable of sliding thereon, in the manner substantially as and for the purpose specified.
8. In combination with an adjustable type-wheel, having two or more series of type, arranged circumferentially, and each type capable of independent movement, mechanism, substantially as described, for operating the same.
9. The combination of movable type with a sliding cam, by means of which a reciprocating motion is given to the type, substantially as and for the purpose specified.
10. The combination of a movable type, a cam-lever, and a sliding cam-bar, substantially as and for the purpose specified.
11. A cylinder, F, having a series of cam-slides, E, and cam-levers K, operating in combination with a type-wheel, L, having movable type M, substantially as and for the purpose specified.
12. The levers K, provided with projections *k'* and cams *k*, substantially as and for the purpose specified.
13. The sliding rod E, having cam *e* and cam-face *e'*, substantially as and for the purpose set forth.
14. The combination of the key-bars G, rods H, cam-bars I, sliding rods E, and levers K, substantially as and for the purposes specified.
15. An adjustable cam-rod, H, in combination with the rod I and key-bar G, substantially as and for the purpose specified.
16. The combination of the key-bars G and rod H, having cam *h'*, with spring *h*, the whole constructed, arranged, and operated substantially as and for the purpose specified.
17. The fixed cam-plate X, operating in combination with the cylinder F and sliding rods E, substantially as and for the purpose specified.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

G. H. MORGAN.

Witnesses:

D. G. STUART,
E. J. SWEET.