

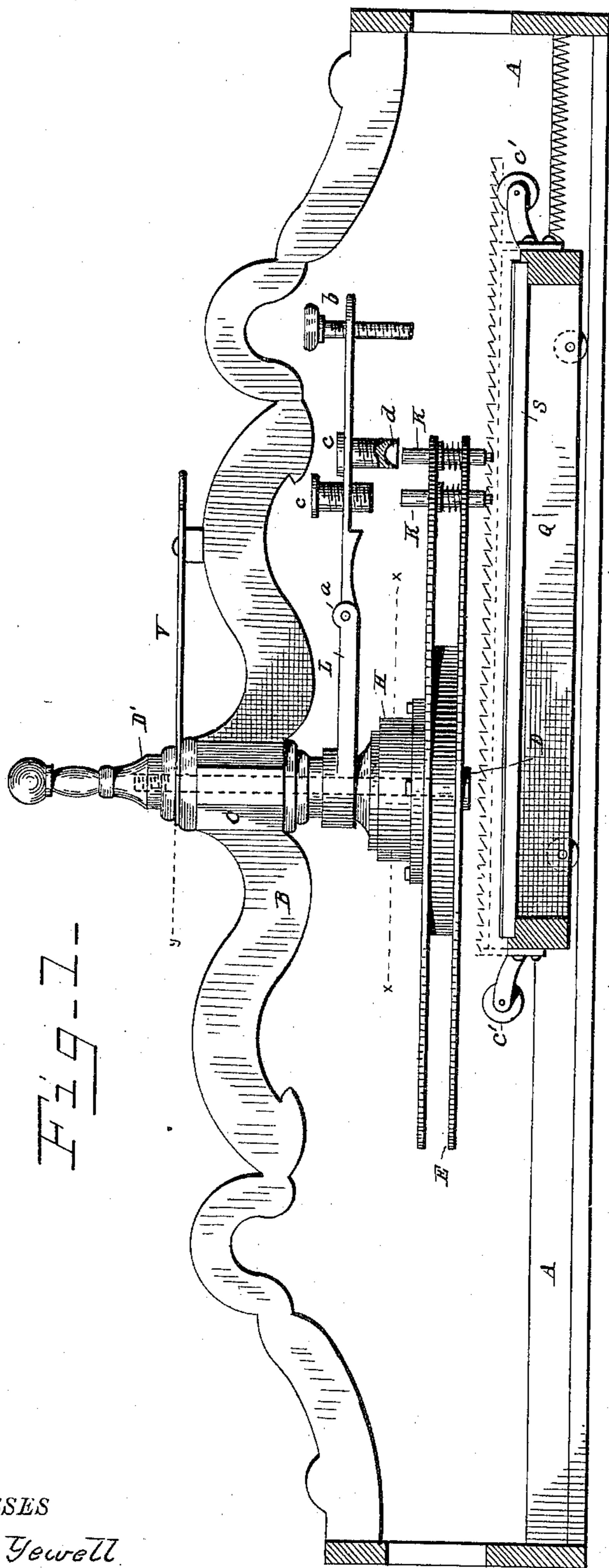
(No Model.)

3 Sheets—Sheet 1.

T. D. WORRALL.
TYPE WRITING MACHINE.

No. 335,670.

Patented Feb. 9, 1886.



WITNESSES

Edwin L. Yewell

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(No Model.)

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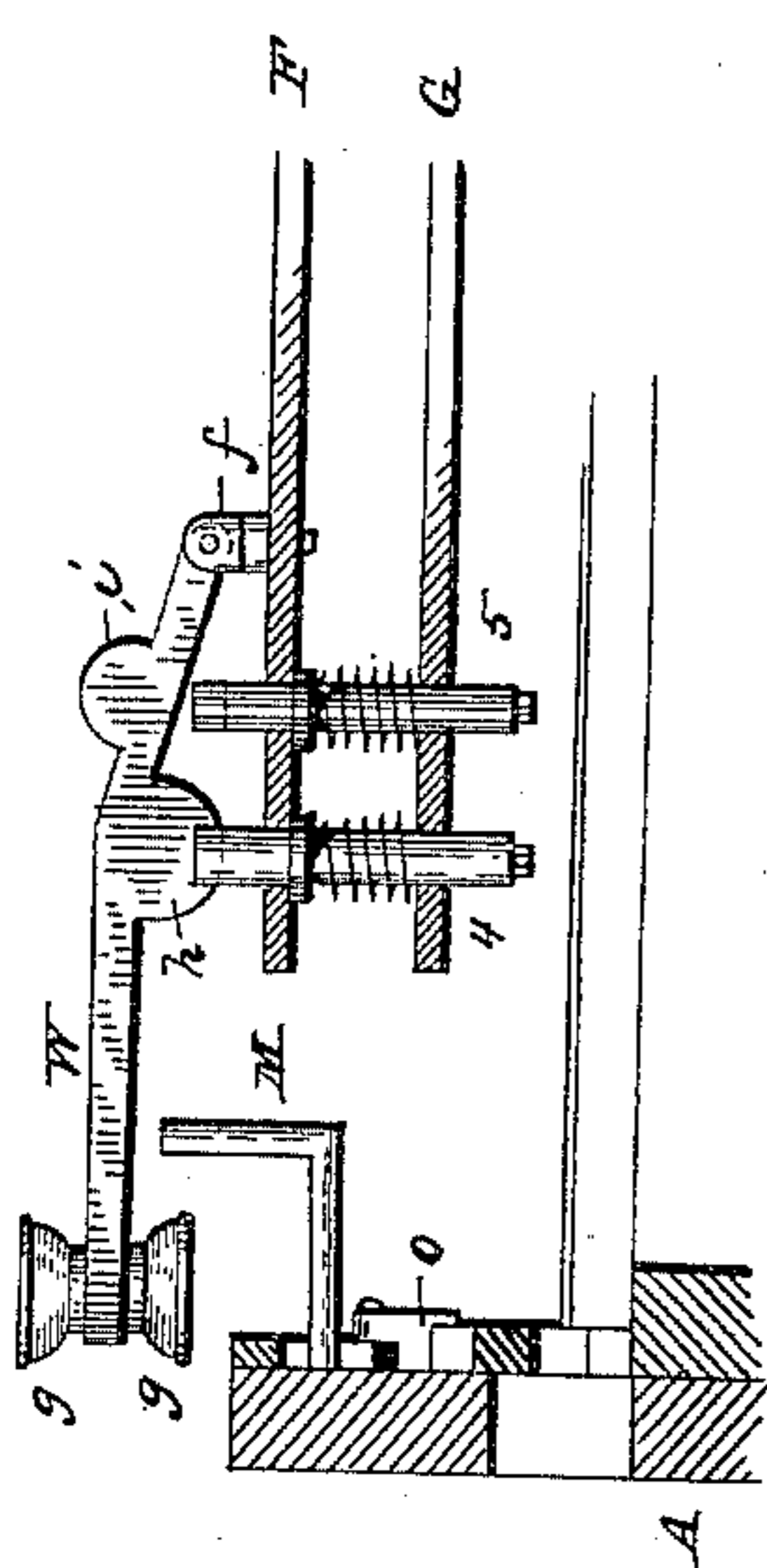


Fig. 3-

Fig. 2-

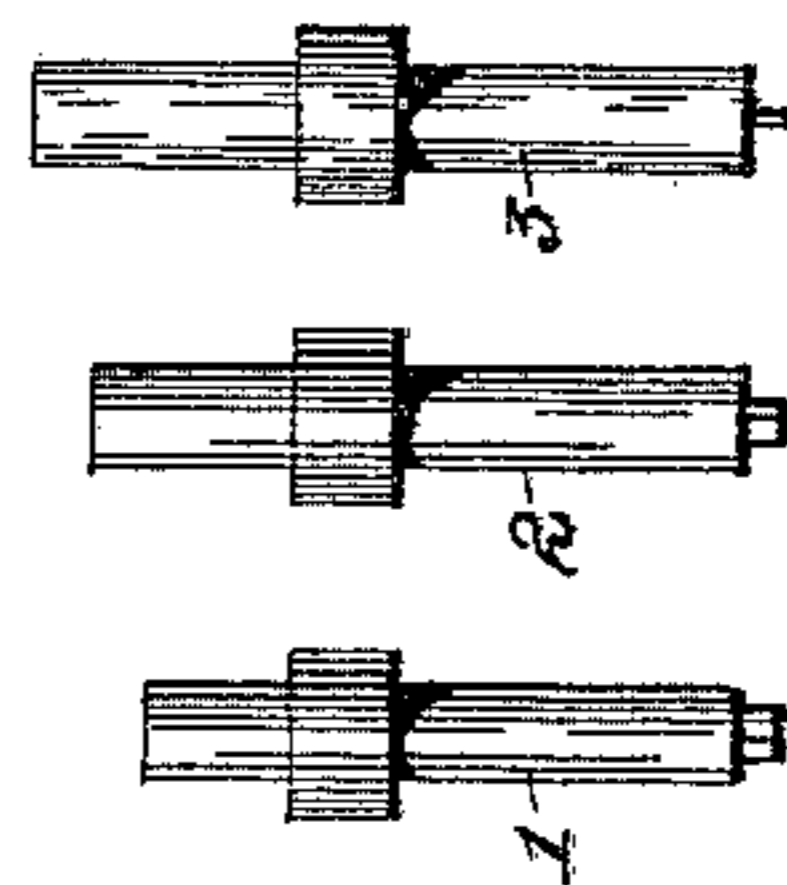
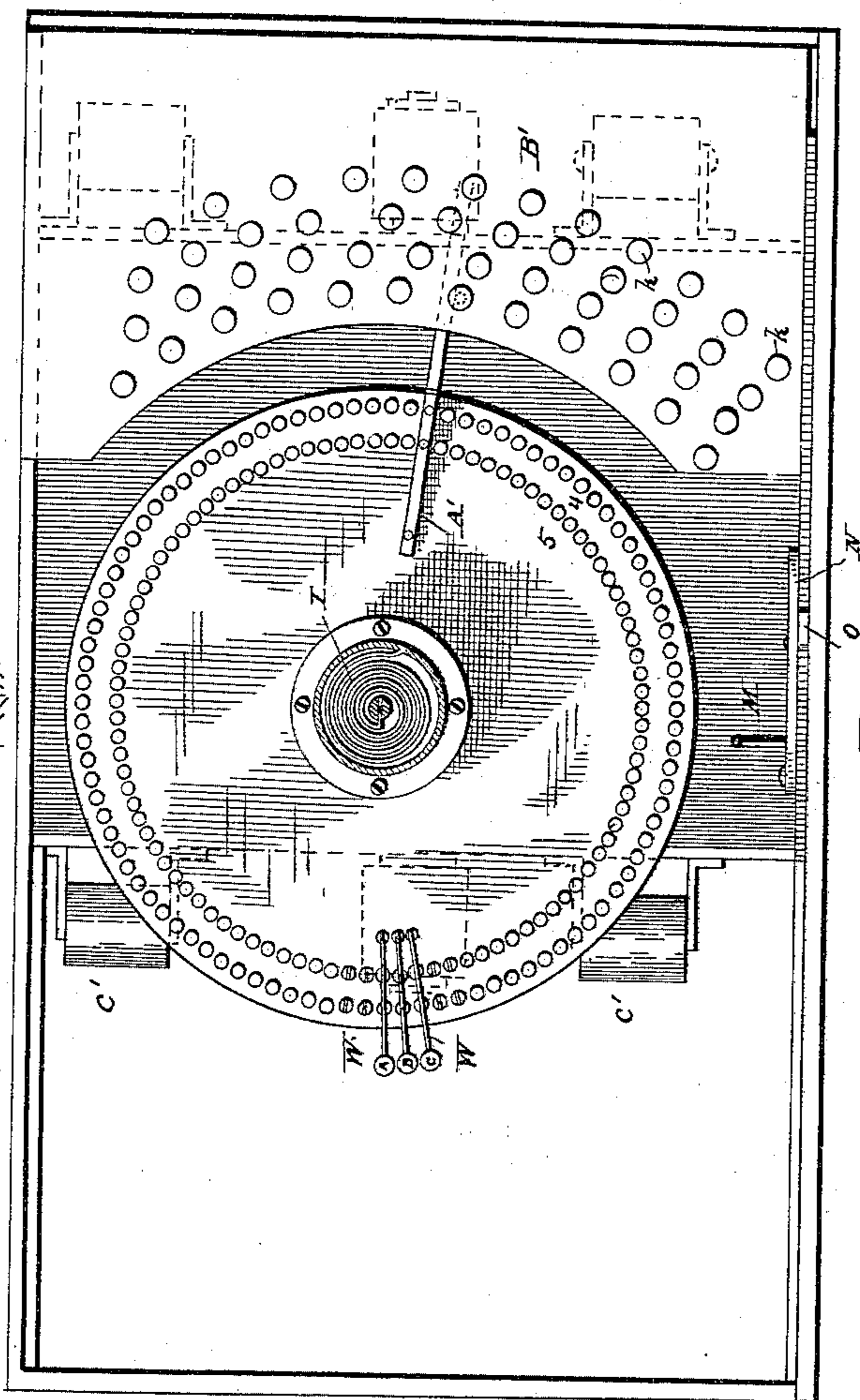


Fig. 4-

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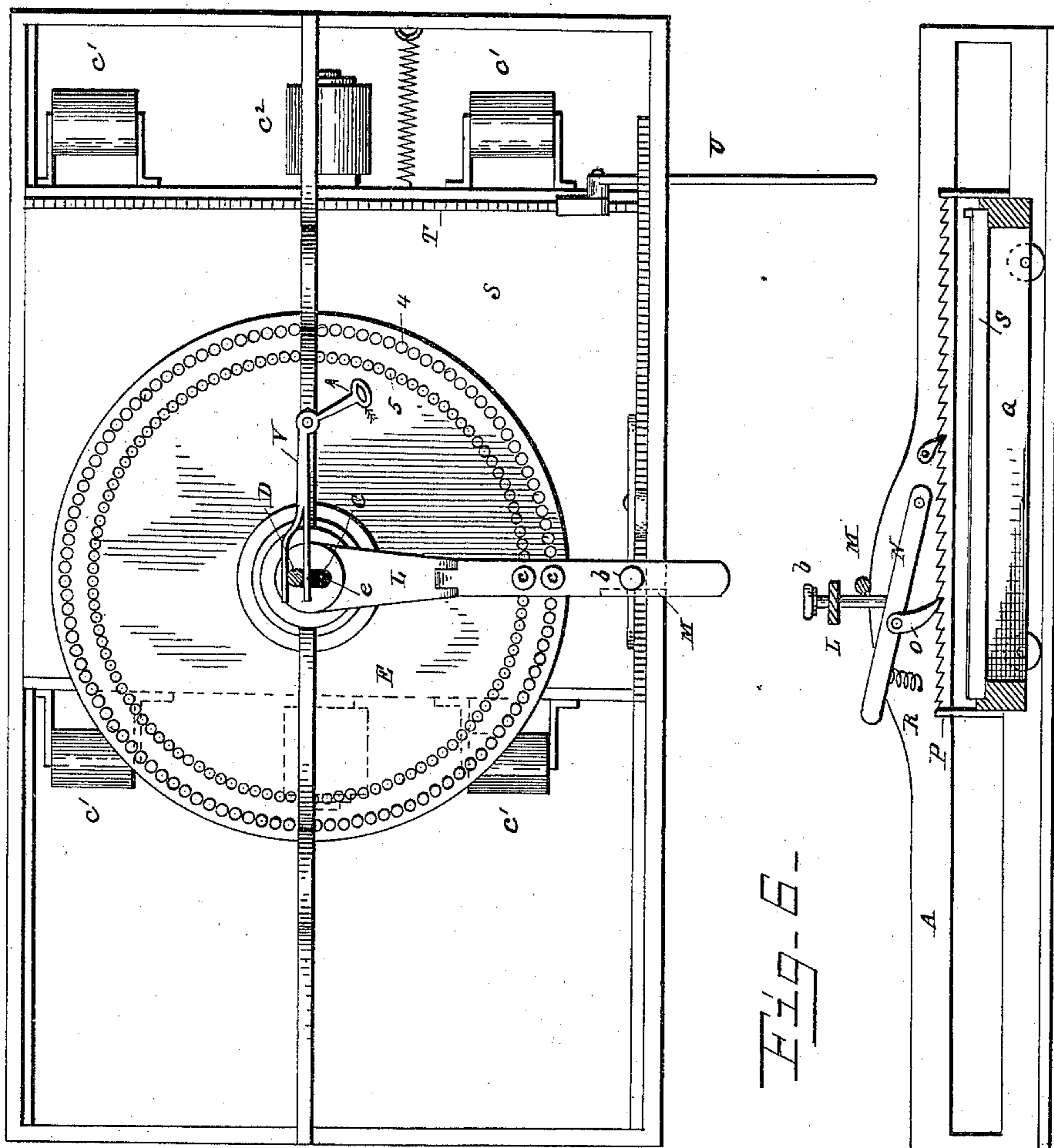
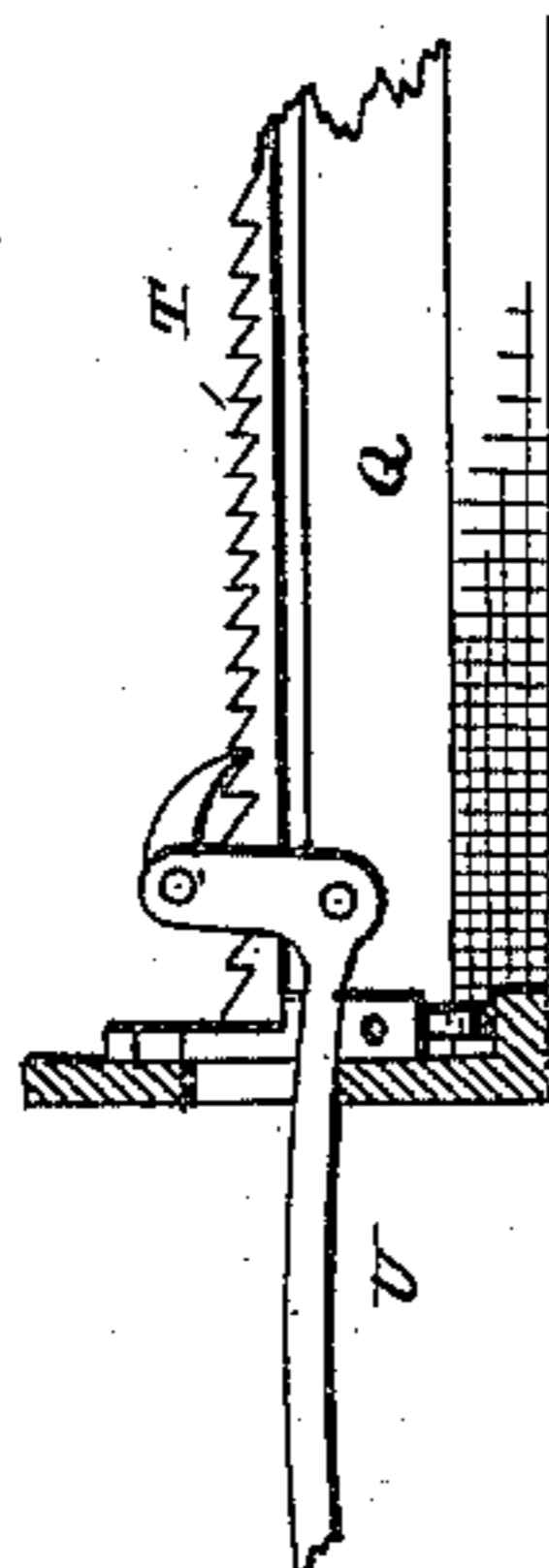


Fig. 5-

Fig. 6-



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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. 335,670, dated February 9, 1886.

Application filed April 18, 1885. Serial No. 162,679. (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 that class of type-writing machines in which the type are carried in a rotating or oscillating disk.

The object of my invention is to arrange a font or series of fonts or batteries of type in compact form in a disk or segment thereof, which is so mounted as to be rotated or oscillated to bring the proper letter or character to the printing center.

Referring to the drawings, Figure 1 is a longitudinal sectional view of my machine with the impression-key away from the printing-center. Fig. 2 is a top or plane view on the line $x x$ of Fig. 1, showing a different form of impression-key, and also a stop-lever adapted to be operated upon by stop-pins when the disk is driven by power. Fig. 3 is a detached sectional view of a portion of the type-carrying disk, impression-key, and stop secured to the frame of the machine. Fig. 4 is a side view of type-carrying pins of different lengths, which also regulate the throw of the impression-key and the consequent movement of the paper-table. Fig. 5 is a top or plan view of my device, showing the adjusting-lever and the impression lever or key in position over the printing center. Fig. 6 is a sectional view showing the paper-carriage, pawl-carrying lever, impression-key, and stop-pin in position ready for moving the paper-carriage and forming the impression on the paper. Fig. 7 is a detached sectional view of the devices for feeding the paper-table forward the requisite distance to print a new line.

A indicates the frame of the machine, which may be of any suitable form or of any desired material.

B is a cross bar or bracket the ends of which are secured in the frame A in any suitable manner, said cross-bar being provided with a hub or enlarged perforated central portion, C, to receive the pin D, which supports the type-carrying disk or wheel E. The aperture in

the hub C is elongated, as shown in Fig. 5, the office or function of which elongation will be more fully described hereinafter.

As before indicated, the type-carrying disk or wheel E is supported in a horizontal position over the paper-bed by the pin or bolt D and screw cap or nut D', said wheel being composed of upper and lower perforated disks, F and G, which carry the fonts or batteries of type of different size. Instead of a full disk I may use a section or segment thereof, as the arrangement of type enables me to have all the letters and characters necessary for ordinary printing within a small compass. I prefer the disk, however, as it is more easily balanced and more readily operated. The central portion of the type-carrying wheel or disk is enlarged to form a chamber, as shown at H, in which is secured the strap-spring I, one end of said spring being secured to the walls of the chamber, and the other end to the post or pin D, so that when the disk has been brought around to the printing center to form an impression it will be returned to its former or normal position by the tension of the spring, and also to cause the type to pass over the composition ink-rollers. One or more rows of type-carrying pins K may be arranged in fonts or batteries in the disk E, said type-pins being provided with springs for raising them after they have been released from the impression-key, as is usual in this class of machines.

L is an impression-key the inner end of which is adapted to fit loosely over the axis of the type-carrying disk in such a manner that it can be moved around independent of the disk E. The impression-key L is hinged or jointed in the center, as shown at a , Fig. 1, so that the outer end is free to be moved up and down and brought into contact with the type-pins.

b is a screw-threaded pin secured in the outer end of the impression-key, and is adapted to be adjusted therein, for purpose which will be presently described.

$c c$ are adjustable pins the lower ends of which are recessed and adapted to fit over the upper ends of the type-pins when the outer end of the impression-key is depressed, the cavity d in the pins c being concave in order to center the type-pin before the final depres-

sion of the key L is made to bring the type into printing contact with the paper.

M is a pin secured to the frame A, which serves to stop the impression-key when brought around, and thus bring the type to the printing-center, the impression-key being placed on the proper type-pin and swung around until it comes in contact with the stop M, when the key is depressed to bring the type into printing contact with the paper.

N is a lever pivoted to the frame A, to the lower side of which is pivoted the pawl O, which meshes with the rack-bar P, secured to the paper-carriage Q, the paper-carriage and rack-bar being of the ordinary or well-known construction. The free end of the pawl-lever N is held up by a spiral spring, R, or other suitable device, so that the lever will be in a proper position to be operated upon, or depressed by bringing the pin *b* of the impression-key in contact therewith.

As before indicated, the pin *b* is adjustable, in order that it may impinge more or less, as the case may be, on the pawl-lever, in order to move the paper-carriage the proper distance to space large or small letters. For example, if a large wide letter is to be used, the pin *b* is screwed down so its lower end will come in contact with the lever N some little time before the impression is made, and by forcing the impression-key down the paper-carriage is moved two, three, or more notches, as the case may be, before the type is brought into contact with the paper. If a small or narrow type is to be used, the pin *b* is screwed up, so that its lower end will impinge but slightly on the pawl-lever, and thus move the paper-carriage only one notch to insure the proper spacing. The same result can be obtained by having the pin *b* stationary or fixed on the impression-key and making the type-pins of different lengths, as shown in Fig. 4. The wide or large type will be secured to the short pins 1, the smaller or medium-sized type to the longer pin 2, while the very small or narrow type will be secured to still longer pin 3, the throw of the pawl-lever being regulated by the length of the type-pins, or, in other words, if a wide letter is to be made the pin *b* will be brought into contact with the pawl-lever and force it down some distance, thus moving the paper-carriage two or more notches before the impression-key comes in contact with the type-pin to force the type in contact with the paper, and so on through the series.

The paper-bed S is mounted on a suitable frame adapted to travel at right angles to the direction of the carriage Q, and is provided with a rack-bar, T, which is operated upon by pawl-lever U, pivoted in the side of the carriage, and by means of which the paper-bed is moved forward to give the proper spacing between the lines.

As before indicated, the type-carrying disk or wheel E is provided with two or more rows of type, 4 5, which may be of different size. The

row 5 may be large type and the row 4 of small type.

It is well known that the large or cap letters are often required in printing or writing—as for example, in the beginning of sentences and in proper names, and, in order to bring such letters onto the printing-line without changing the paper-bed, I make the opening *e* in the hub *c*, which receives the disk-supporting pin, elongated, as shown in Fig. 5.

V is a lever pivoted to the bracket or cross-bar the front end of which is bifurcated or yoke-shaped, and embraces the supporting-pin D of the type-holding disk, so that when it is desirable to bring one or more of the large letters in the row 5 down onto the printing-line the lever V is pushed back in the direction of the arrow, which will move the type-holding disk and its supporting-pin into the proper position to bring the proper letter under the impression-key, and when the operator is through with the larger or cap letters the lever V is moved in a reverse direction, which brings the small type in the row 4 into a proper position for printing.

In Fig. 3, and at left hand of Fig. 2, I have shown a modification of the impression-keys. In this instance each set or pair of type-pins is provided with an impression-key, W, the inner end of which is pivoted to the swiveled post *f*, while the outer end is provided with a double knob or button, *g*, bearing letters corresponding to the type in the type-pins underneath it. The impression-keys W are provided on opposite sides with projections *h* and *i*, which rest in slots formed in the upper ends of the type-pins.

When it is desired to print with the type in the row 4, the projection *h* is inserted in the slot in the type-pin of that row, as shown in Fig. 3; but when it is desirable to operate on the type-pin in the row 5, the lever W is raised and turned on the swivel-pin *f*, to which said lever is pivoted. This will bring the projection *i* in contact with the type-pin in row 5, and thus the same lever is readily made to operate on either row of type.

In operating a machine having this system of impression-keys, the operator simply takes hold of and slightly depresses the proper key and swings the disk around until the key strikes the stop M, when the lever is depressed to bring the type into printing contact with the paper.

The ends of the impression-keys are so arranged that they will strike the pawl-lever N and move the paper-carriage in the same manner as has already been described in relation to Fig. 5.

In order to adapt the type-holding disk to be driven by power, I connect it in any suitable manner with treadle wheel and pitman, so that the disk will be thrown around a certain distance and released, the tension of the spring being sufficient to return the disk.

When it is desired to operate the disk by

power, as above described, the disk in this case is provided with one or more adjustable arms, A', which project over under the key-board B, said key-board being provided with stop-keys k, which, when depressed, serve to catch the lever or arm A' and stop the disk with the proper type on the printing-center.

In an application for a patent filed by me March 30, 1885, Serial No. 160,618, I have shown, described, and claimed fonts or batteries of type operated by power and brought to a printing-center by stop-pins, and my only object in referring to it here is to show how the same principle can be applied to rotating or oscillating type-holders.

C' C² are inking-rollers arranged at each end of the paper-carriage, and are so arranged that they will revolve on their bearings when the face of the type in the rotating disk is brought in contact therewith. Instead of the rollers, I may employ an inking-ribbon arranged under the type at the printing center in the usual manner.

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

1. In a type-writing machine, a type-carrying disk carrying fonts or batteries of different kinds of type suspended over the paper-bed, and adapted to be rotated to bring the proper letter or character to the printing center, said disk being operated upon by a spring to return it to a given point after the type-pin has been released from contact with the impression-key, as set forth.

2. In a type-writing machine, the combination of a type-carrying disk suspended over the paper-bed, with the supporting-bracket having a slot therein in which the axis of the disk is adjustable, as set forth.

3. In a type-writing machine, the hub C, provided with the slot e, and adapted to receive the supporting-pin of the type-carrying

disk, in combination with said type-carrying disk and bifurcated lever V, as set forth.

4. In a type-writing machine, the combination of the paper-carriage having a rack-bar, and a pivoted lever carrying a pawl adapted to engage said rack, with an impression-key having an adjustable pin adapted to impinge more or less, as the case may be, on the pawl-operating lever to move the paper-carriage the proper distance before the type are brought into printing contact with the paper, as set forth.

5. In a type-writing machine, the type-carrying disk or segment thereof carrying type-holding pins of different lengths, as described, in combination with an impression-key having a pin to impinge on and operate the pawl-lever, as set forth.

6. In a type-writing machine, a type-carrying disk or segment thereof having a plurality of rows of type provided with jointed or pivoted impression-keys adapted to be brought into contact with the type-pins of either row of type, as set forth.

7. In a type-writing machine, a type-holding disk carrying fonts or batteries of type, in combination with an impression-key and a stop-pin and pawl-operating lever, whereby the proper type is brought to the printing center, the paper-carriage moved the requisite distance, and the type brought into printing contact with the paper, as set forth.

8. The combination, with the type-carrier, of the jointed impression-key journaled on the shaft of the type-carrier, and directly engaging the type-pins to rotate the carrier and make the impression.

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

THOS. D. WORRALL.

Witnesses:

N. D. ADAMS,
JACOBUS S. JONES.