

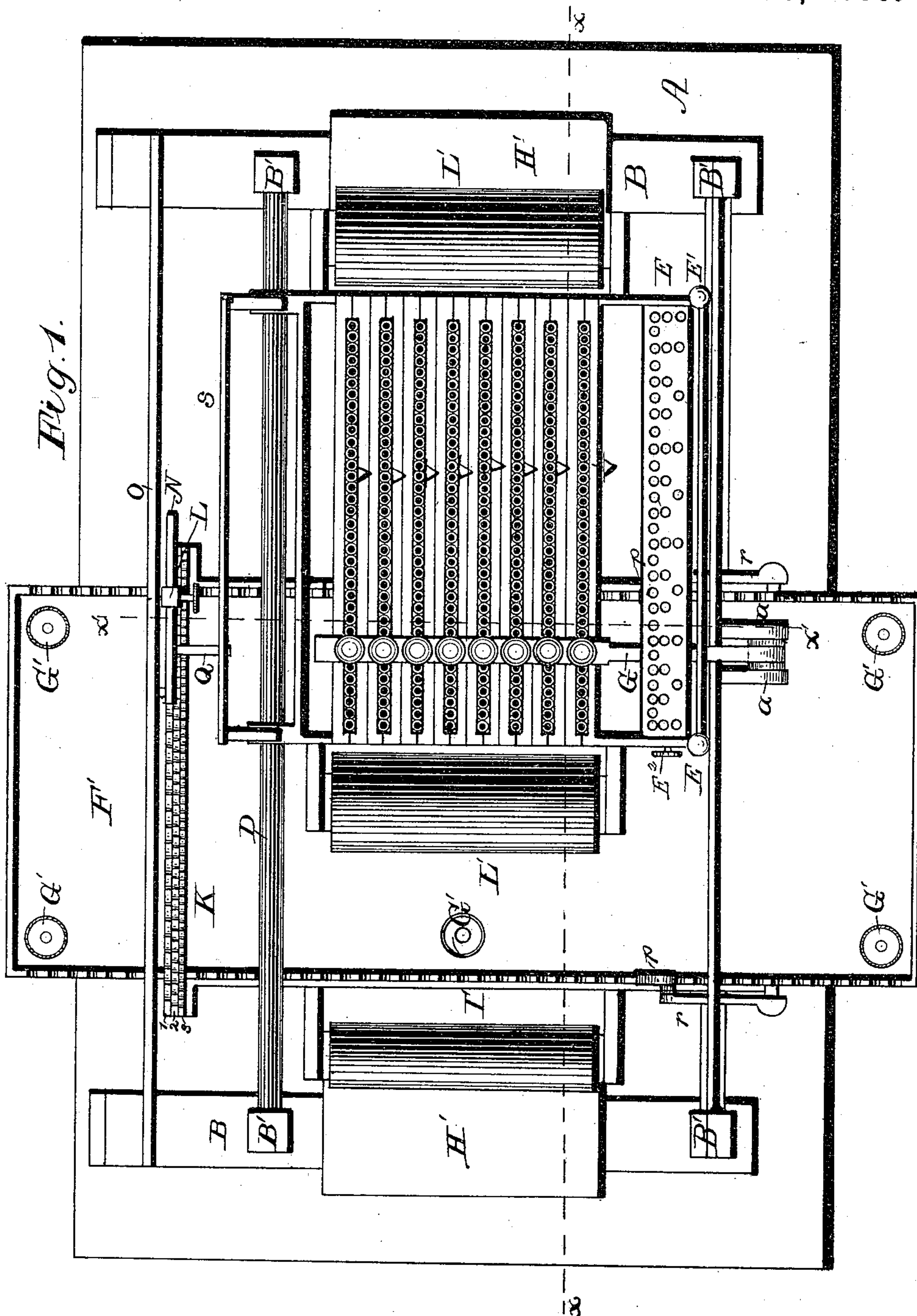
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6 Sheets—Sheet 1.

T. D. WORRALL.
TYPE WRITING MACHINE.

No. 336,278.

Patented Feb. 16, 1886.



WITNESSES

WITNESSES
C. L. Edwards
E. B. Tower

INVENTOR

Thos. D. Horvath

By *his* Attorney

By his Attorney
Wm Sinsbaugh

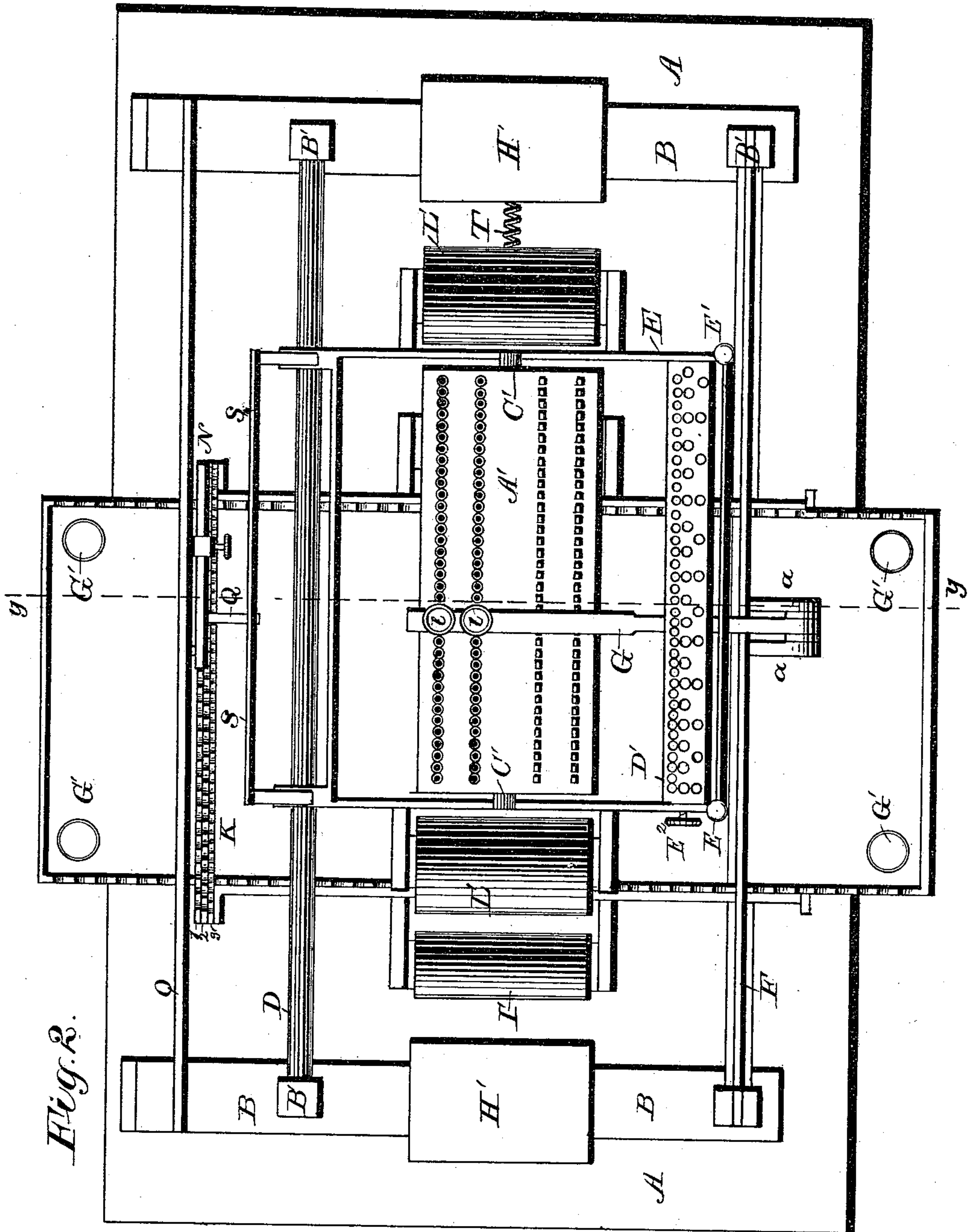
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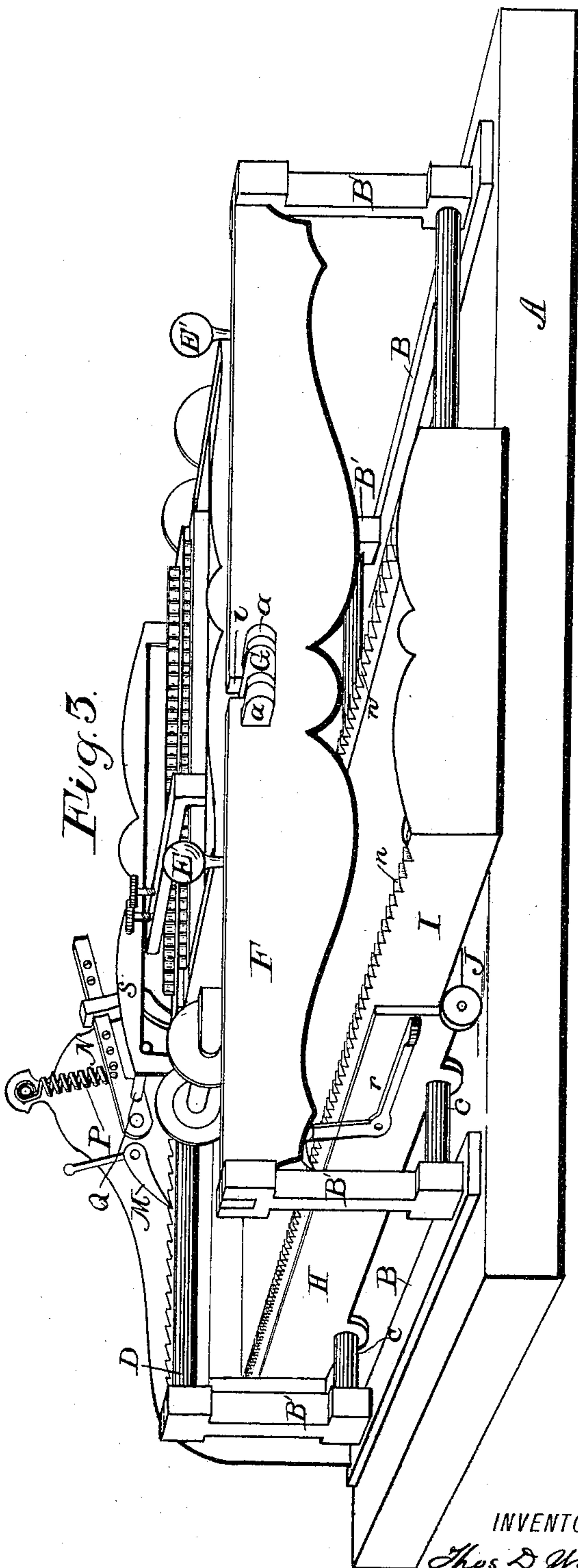
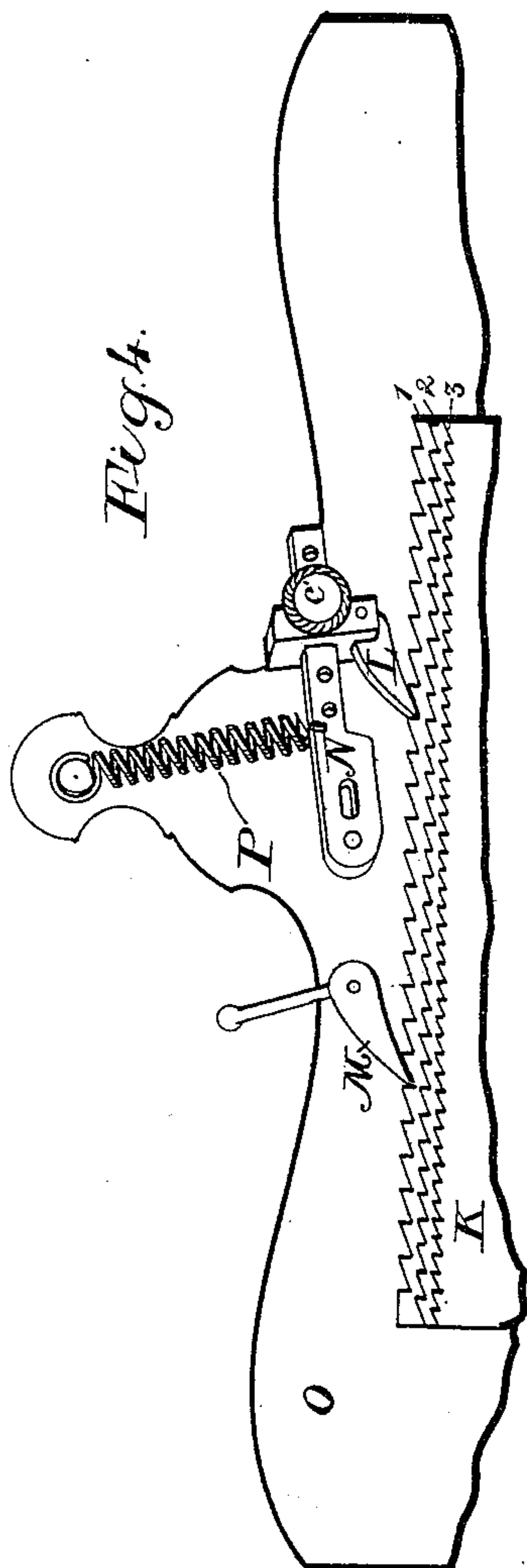
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(No Model.)

6 Sheets—Sheet 4.

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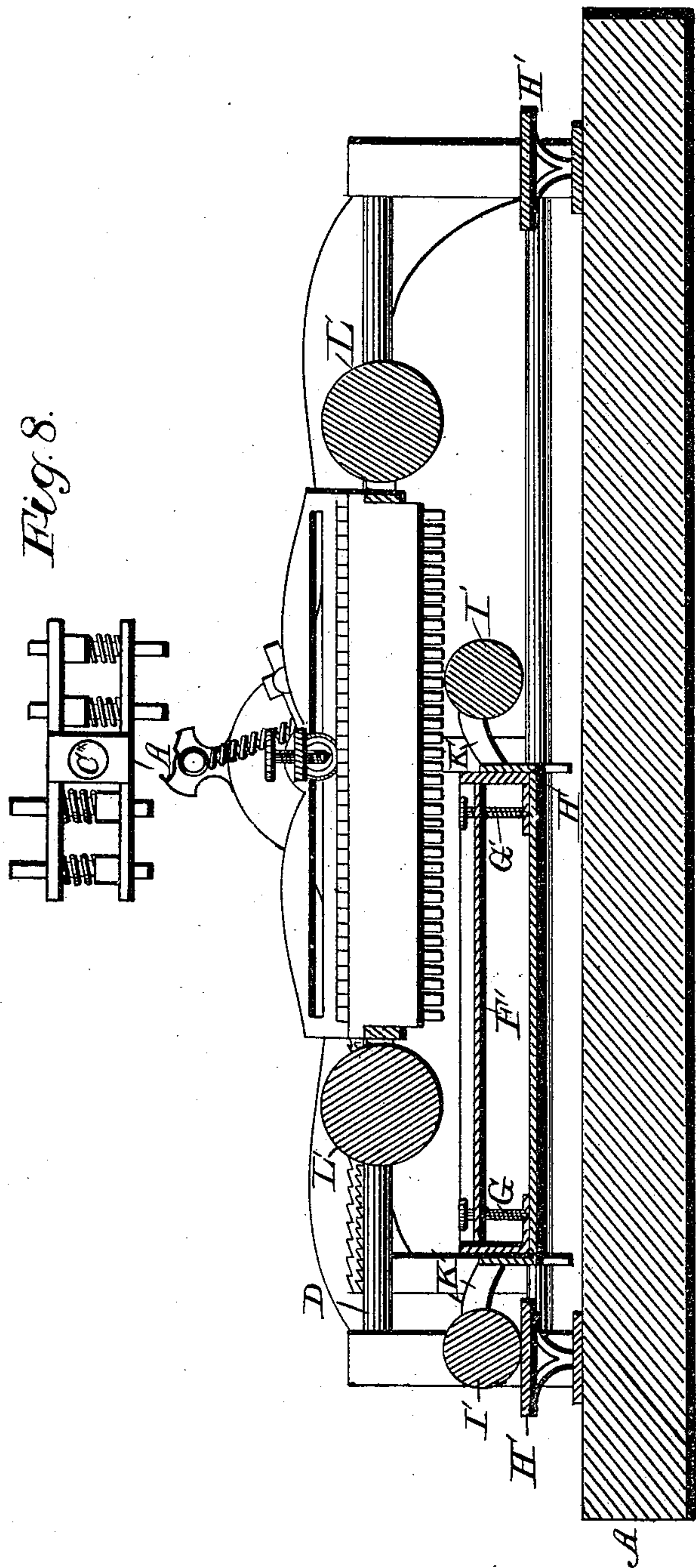


Fig. 8.

Fig. 5.

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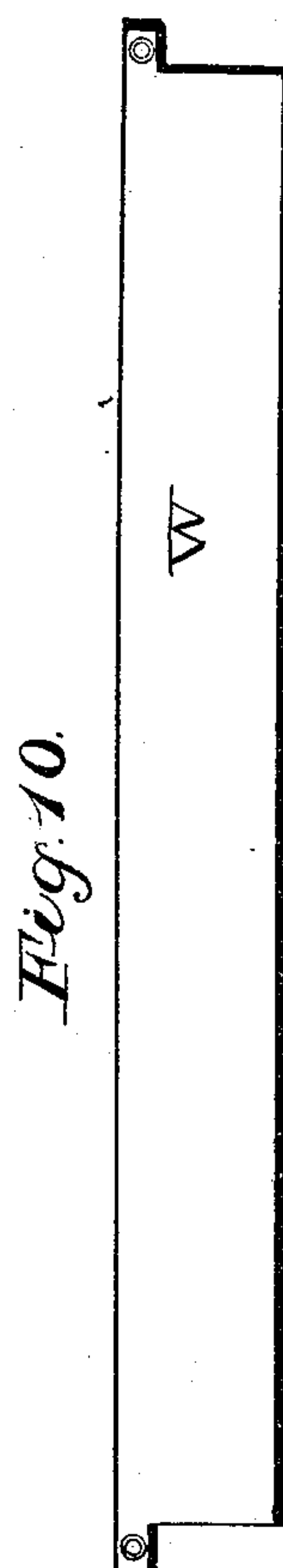
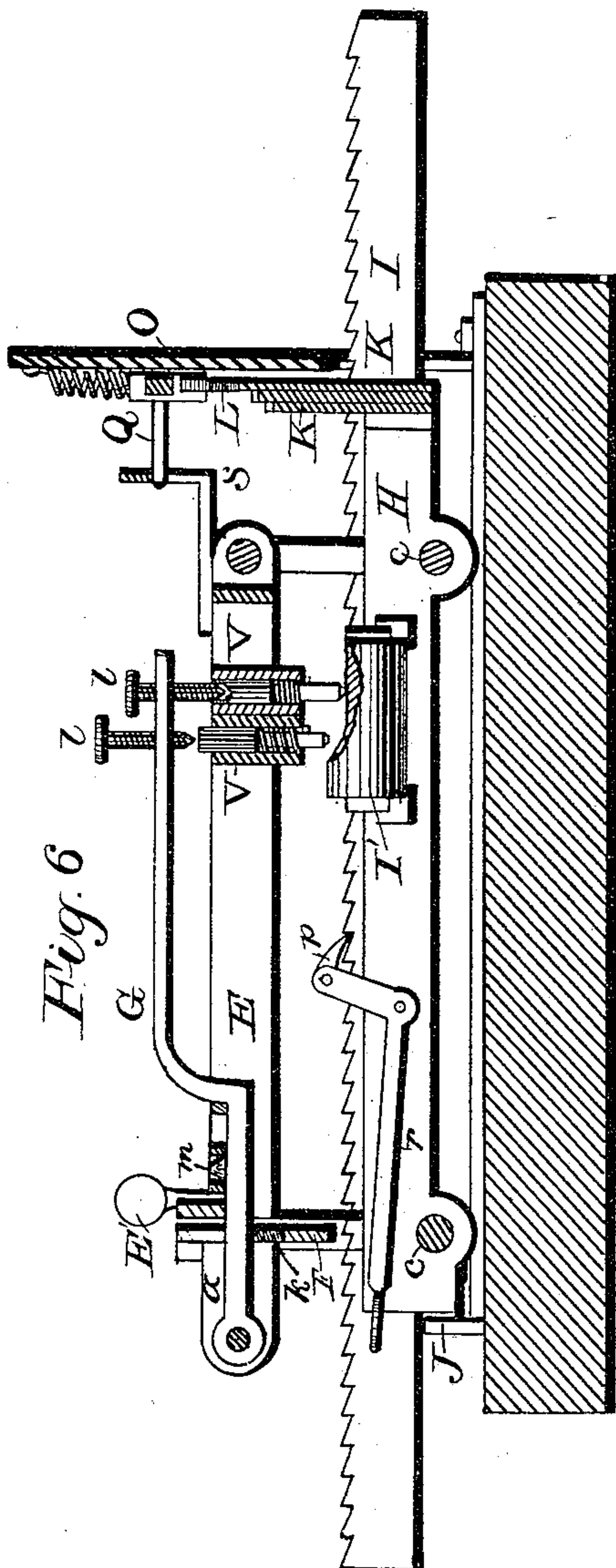
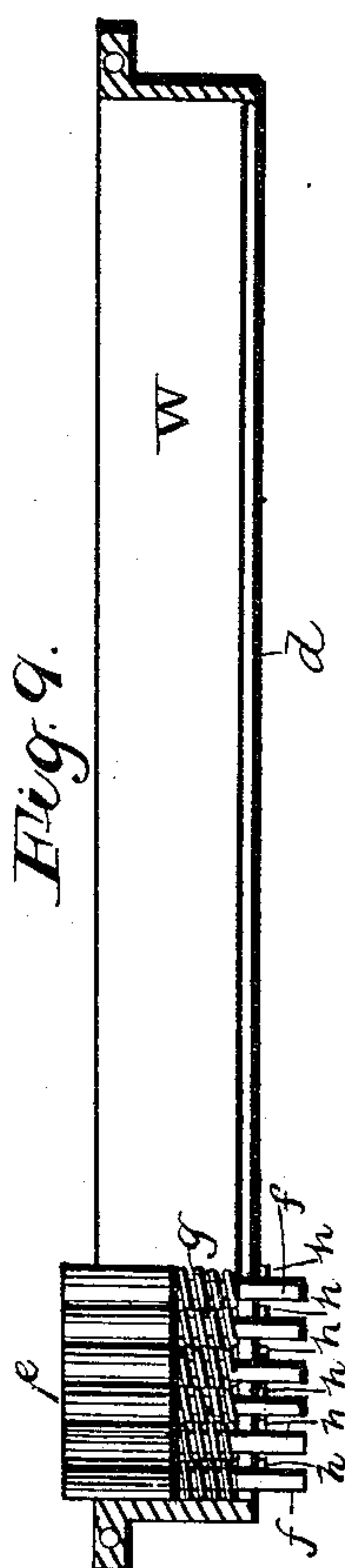
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No. 336,278.

Patented Feb. 16, 1886.



WITNESSES
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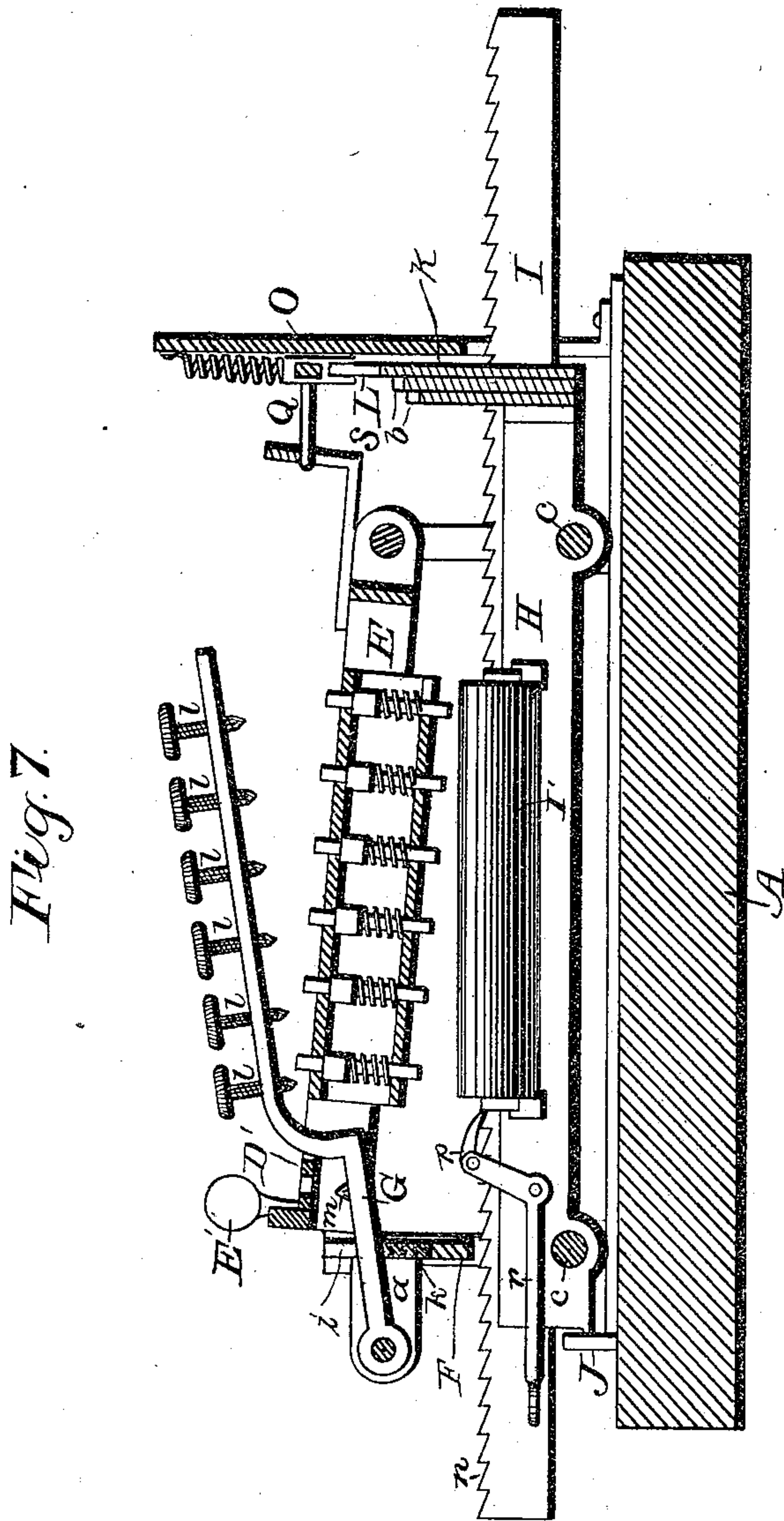
(No Model.)

6 Sheets—Sheet 6.

T. D. WORRALL.
TYPE WRITING MACHINE.

No. 336,278.

Patented Feb. 16, 1886.



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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. 336,278, dated February 16, 1886.

Application filed March 23, 1885. Serial No. 159,815. (No model.)

To all whom it may concern:

Be it known that I, THOMAS D. WORRALL, a citizen of the United States, residing in Washington, in the District of Columbia, have
5 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
10 type-writing machines.

The object of my invention is to provide a simple and inexpensive machine which can be readily operated by any person whether skilled in this art or not.

15 Referring to the drawings, Figure 1 is a top or plan view of my improved type-writer, showing a series of independent fonts or batteries of type. Fig. 2 is also a plan view showing a series of fonts of type in one holder,
20 adapted to be rotated or turned on pivots or trunnions. Fig. 3 is a view in perspective. Fig. 4 is a detached view of the series of rack-bars and the swinging lever, with the adjustable pawl. Fig. 5 is a longitudinal sectional view on the line xx of Fig. 1. Fig. 6
25 is a sectional view on the line yy of Fig. 2. Fig. 7 is a similar view on the line $x'x'$ of Fig. 1. Fig. 8 is an end view of a type-holding frame in which one series or set of type is
30 placed in reverse position. Fig. 9 is a sectional view of another form of type-holder. Fig. 10 is a view of the detached side of the type-holder shown in Fig. 9.

A indicates the base or bed of the machine,
35 to which are secured the plates B B and standards or supports B' B'.

$c c$ are guide-rods supported in the standards, which pass through the side pieces of the paper-carrying frame, and by which means
40 said frame is guided in its reciprocating movements.

D is a guide-bar, which is also secured in or supported by the rear standards, B', and on which the rear end of the type-carrying frame
45 E is mounted in such a manner that said frame is free to move back and forth on the guide-rod.

The type-carrying frame may be secured to the guide-rod D in any convenient or desirable manner; but I prefer to pass the guide-rod
50 D through holes in the projecting ends of the type-frame, as shown, so that the front end

of said frame can be readily raised and lowered.

F is a plate, of metal or other suitable material, secured in the upper ends of the front standards, and is provided with lugs a , in which the front end of the impression-bar or hammer G is pivoted, as will more fully hereinafter appear.
55
60

H is a carriage or frame for supporting the frame I, which forms the paper bed or support, said carriage being provided with wheels or rollers J, and guided in its reciprocating movements by the bars C C, as before indicated. The rear portion of the carriage H is provided with one or more upwardly-projecting plates, K, the upper edges of which have serrations b , which form a rack or ratchet-bar, in which the operating-pawl L and retaining-pawl M operate to move the carriage the proper distance to space the letters, and retain the same in position until the impression has been made by the type.
65
70

It will be noticed that the series of toothed rack or ratchet bars K are provided with teeth
75 or notches of different size, so as to enable the paper carriage or bed to be moved the proper distance required for different-sized type. For example, we will suppose that large type are
80 being used. The pawl L, as shown in Fig. 4, will rest in and operate the carriage through the large ratchet-teeth 1. If medium-size type are used, then the pawl is placed in the teeth 2, and if small type is used, then the pawl L
85 is placed in the teeth 3. It will be noticed, however, that the pawl L is adjustably secured to the bar N by means of the set-screw c' or other suitable device, said bar being pivoted
90 to the frame or bracket O, so that by adjusting the pawl L toward and from the pivotal point of the lever I am enabled to regulate the throw of the pawl, and thus control the movement of the paper-carriage without resorting to the use of the different ratchet-bars 1 2 3.
95 It will be understood that the frame or bracket O is rigidly secured to the base A and that the retaining-pawl M is pivoted thereto, so that when the carriage H is moved one or more notches it will be held in its forward
100 position by said pawl. The lever N and pawl L are operated upon by a spiral spring, P, one end of which is secured to the bracket or frame O, while the other end of said spring

is secured to the lever N, by which means the free end of the lever is raised and the pawl L drawn back to engage with another notch or tooth in the rack-bar.

5 Q is a stud or pin secured to the pawl-lever N, and projects forward under the bar S, secured to the rear portion of the type-carrying frame E, so that when the front end of the type-carriage is raised the bar S will impinge
10 on the stud Q and depress the pawl-operating lever N, and thus move the paper-carriage the proper distance to space the letters. This is a very important feature of my invention, for it will be noticed that the front end of the
15 type frame or carriage can be raised and lowered any desired number of times without depressing the impression-key, and by this means the paper-carriage can be moved forward any desired distance without bringing the type
20 into printing contact with the paper; or, in other words, the free motion, being independent of the motion of the type frame or carriage which operates the impression-lever, several or any number of teeth of the ratchet-bar can
25 be operated upon before the impression of the type is made on the paper, and by this means the operator is enabled to space out the words at the end of the lines without making a mistake in the division of a word.

30 T is a spiral spring one end of which is secured to the paper-carriage and the other end is secured to the base A, so that when the carriage has been moved over its full distance to form a line of printing, on releasing the
35 pawls L and M from the rack or ratchet bar the carriage will be drawn back to the proper position to print a new line by the recoil of the spring.

40 Having described the parts which operate the paper-carriage to produce the proper spacing of the letters, I will now proceed to describe the type-holders and the devices which operate to produce the printing. The type-carrying frame is adapted to receive and
45 hold one or more fonts or batteries of different-sized type, and is so arranged that the fonts or batteries can be readily interchanged to bring the large or small type into use, as occasion may require.

50 In Fig. 1 I have shown a series of type-holders, V, or fonts of type arranged in the type-carriage, and which may contain type of different size. These type-holders may be held in the type frame or carriage by means of
55 screws, springs, or other suitable retaining devices, which will enable the operator to quickly move the desired font or battery of type into the proper position to be operated upon by the impression-lever. I have shown two forms
60 of type-holding bars, but do not wish to confine myself to such, as it is obvious that other forms can be used without departing from the spirit of my invention, the main feature of this portion of my invention being the group-
65 ing of the type into a compact form, so they can be readily brought under the impression-key.

The form of type-holder shown in Figs. 9 and 10 consists of a slotted piece of metal, or
70 of two pieces of metal, W, secured together and having a central aperture or cavity for the reception of the type-holding pins, a ledge or flange, d, being provided, which forms the point of contact or resistance for the spiral
75 springs which surround the type-holding pins. The type-holding pins consist of the head e, which may be flattened at the sides, so as to bring the pins closer together and also prevent them from turning, and a smaller or con-
80 tracted portion, f, which projects through the slot in the type-holding bar, and to which the type are secured in any convenient manner, or the shank of the type may be secured in the heads or pins e and form the portion
85 which projects through the slot of the type-holding-bar. g are spiral springs which surround the contracted portion of the type-pins, the lower ends of which rest on the ledge d, while the upper ends impinge against the un-
90 der side of the head e, the office or function of the springs being to raise the type and type-pins from contact with the paper as soon as the impression key or hammer is raised, while the stops or pins h on the contracted
95 portion f prevent the pins from being forced too high by the action of the springs. By this construction of type-holder I am enabled to bring the necessary font of letters, figures, or characters into a comparatively small com-
100 pass.

In Figs. 2 and 8 I have shown another form of type-holder, A', which is designed to hold type of different kinds and sizes. This type-
105 holder consists of an upper and lower perforated plate secured together by end plates, and between which the type-pins are held, as shown in Fig. 8, the ends of said type-pins projecting through the perforations in the
110 plates. The type-holder A' is mounted on trunnions C' in the type-carrying frame E, and the type pins on each side are set in reverse direction, so that when a large or small type or upper and lower case is required all that is
115 necessary to be done is to turn the type-holder on its trunnions and bring the line of type in proper position under the impression-key. By having a series of pins on the impression-bar and by turning the font or battery A' on its
120 trunnions I am enabled to print properly without any lateral movement of the font to bring the type into printing position. This I accomplish by adjusting the proper pin, l, in the im-
125 pression-key and moving the paper-table I back or forward, as the case may require, so as to bring the paper into the proper position to receive the impression from the type, and
130 thus form a printing point or center at any point along the impression key or hammer. The type-pins in this form of holder are provided with spiral springs, shoulders, and stops, so they will have the required vertical move-
ment in the holders, when operated upon by the impression key or bar, to effect the printing and be returned again to an elevated

position by the spiral spring when released from the pressure of the impression-bar. As before stated, G is the impression bar or key, pivoted at its front end in the lugs *a* of the bar F, and adapted to work in a slot or recess, *i*, in the plate F. The outer end of the impression key or bar is held up from contact with the type pins by means of the spiral or other spring *k*, said spring being of sufficient strength to hold not only the impression-key, but also serve as a support for the front part of the type-carrying frame when the machine is not in use. The impression key or bar is provided with one or a series of screw-threaded apertures, in which the screw-threaded pins *l* are inserted, by which means any one or all of said pins can be adjusted to operate on the type-pins. The heads of the type-pins are provided with a suitable-shaped cavity to receive the lower ends of the pins *l*, by which means the type are properly centered or brought to the desired position before the impression-key G is depressed to effect the printing. The type-pins may, however, project some little distance above the holder and be adapted to fit into recesses formed in the under side of the impression-key, thus effecting the same result. As a guide to the operator, and also as a safeguard to insure the proper centering of the type-pins under the impression key or bar, I secure to the type-carrying frame E an index-plate, D', provided with numerous apertures, which are lettered or numbered to conform with the type in the type-holder. This index-plate may be adjustably secured to the type-carrying frame, as by set-screw E², and may be provided with a series of rows of apertures, each set of holes being adapted and arranged with relation to the font of type with which it is used—viz., should a font of, say, nonpareil be used the holes would necessarily have to be closer together than when pica or other larger type is used. *m* is a centering point or pin secured to the upper side of the impression-key G, so that when one of the perforations in the index-plate bearing the proper letter is brought over the pin *m* and the front end of the type-carrying frame depressed the proper letter or character will be printed on the paper. By this means two centering-points for the impression-key are provided—viz., the pin *m* and the pin *l*—which enter the cavity in the top of the type-pin, thus providing a safe and reliable means for bringing the proper type into printing position. The type in the type-holes and the lettered holes in the index-plate are systematically arranged with relation to the letters most used by printers—for example, the letters E T S, &c., are arranged together or in close relation to each other, so that the type-carrying frame will not have to move any great distance, or its entire length, except at intervals, to bring to the printing center some letter or character not frequently used.

In Fig. 1 I have shown a series of type-holders mounted in the type-carrying frame,

and also a series of pins in the impression-key G, which register with the type-pins in the holder, the letters or characters being arranged the same in all the type-holders, by which arrangement I am enabled to print in duplicate or produce any desired number of lines at one and the same operation. This arrangement of type and method of operation will be found specially useful in ribbon-printing and in reporting a number of copies of stock-reports, market-quotations, &c. The type-carrying frame is provided with knobs or handles E' at the front corners, by which the front part of said frame is moved up and down and also moved back and forth, to bring the proper letter under the impression-key. The paper-holding frame I is adapted to slide in ways in the carriage H and at right angles to its line of motion, and is provided with a series of ratchet-teeth, *n*, on the upper edge of its sides, adapted to receive the pawls *p*, which are secured to the ends of the bent or bell-crank levers *r*, said levers being pivoted to the sides of the carriage H. By this construction I am enabled to move the paper-holding bed forward the desired distance to print or write another line by simply raising the outer ends of the bell-crank levers *r*.

F' is the bottom of the paper-carriage, and consists of a board or metal plate adjustably secured to the frame or carrier I by means of set-screws G'. This construction enables me to raise or lower the paper-support so that the operator can write in books of different size or on tablets or pads as well as on a single sheet or thickness of paper.

H' H' are inking-tables secured at each end of the frame-work of the machine, and are supplied with the ordinary or any suitable ink in any well-known manner.

I' I' are inking-rollers mounted loosely in brackets K' on the ends of the paper-carriage, and receive their supply of ink from the tables H' as the paper-carriage is brought back and forth in the printing operation.

L' L' are ink-distributing rolls loosely mounted in suitable bearings in each end of the type-carrying frame. The function of the distributing rolls L' is to distribute the ink evenly on the ink-rollers I', so that as the type-carrying frame is moved back and forth in the process of writing the ink will be evenly distributed on the rolls I', and the type will be kept at all times supplied with ink by reason of their contact with the ink-rollers.

When it is desirable to use an inking-ribbon instead of a regular inking apparatus, as described, I remove the ink-distributing rollers L', and in their place substitute reels or rolls, by means of which the inking-ribbons are brought under the font or battery of type.

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

1. The combination, with the type-carriage pivoted so as to be capable of a rocking or

swinging motion, and having spring-seated type, of an impression-key fixed at the printing-point, the whole being constructed and arranged substantially as described, so that
5 the impression-key is depressed and the impression made on the downward movement of the type-carriage.

2. The combination, with the type-carriage pivoted so as to be capable of rocking or
10 swinging motion, of the paper-carriage, an impression-key, and mechanism, substantially as described, for operating the paper-carriage and impression-key by the rocking or swinging motion of the type-carriage.

15 3. In a type-writing machine, a pivoted type-holding carriage capable of a horizontal reciprocating motion, and having a part projecting beyond the pivot engaging a projection from the feed-pawl, in combination with
20 a swinging pawl, the rack-bar, and the paper-carriage, whereby the paper-bed is moved the proper spacing distance by the upward-swinging motion of the type-carriage, as set forth.

25 4. In a type-writing machine, a type-holding carriage adapted to slide back and forth and have a rocking movement on the guide-bar, in combination with devices, substantially
30 such as described, for moving the paper-bed, and an impression-key whereby the paper-carriage is moved by the upward motion of the type-carrying frame, and the impression-key depressed to bring the type into printing
35 contact with the paper by the downward motion of said frame.

5. The combination, with a type-carriage capable of horizontal reciprocation to bring any desired type of a given font to the printing-point, of a plurality of independent type-
40 holders, each having a different font, and capable of being adjusted in the carriage to bring the proper font into printing position.

6. In a type-writing machine, a swinging or reversible type-battery composed of a plurality
45 of fonts of type set in opposite directions, whereby the desired style or size of type can be brought into the proper position by swinging or turning the battery on its trunnions or pivoted centers, as set forth.

50 7. In a type-writing machine, a font or battery of type mounted in a sliding and swinging frame, as described, in combination with a stationary impression key or hammer oper-

ated by the swinging type-carrying frame, as set forth.

8. In a type-writing machine, a type-carrying frame having removable fonts or batteries of type, and an index-plate adjustably secured in said frame by set-screws, and provided with graduated apertures to correspond to the type
60 in the font or battery, in combination with the impression-key G and pin or point m, as set forth.

9. In a type-writing machine, a series of movable fonts or batteries of type and a stationary impression-key having a plurality of adjustable pins for depressing the type, in combination with a centering pin or stud, and an index-plate secured to the type-carrying frame and having a series of holes corresponding
70 with the series of fonts of type.

10. In a type-writing machine, a paper-carriage adapted to slide in suitable guides, and provided with the toothed rack or ratchet bar K, having fine and coarse teeth, in combination with the movable pawl L, and devices,
75 substantially such as described, for operating said pawl, whereby the movement of the paper-carriage is regulated to produce proper spacing of type of different or varying size,
80 as set forth.

11. The swinging arm or lever N, provided with the pin I, and adjustable pawl L, in combination with the swinging type-carrying frame E, bar S, paper-carriage 4, and rack-
85 bar K, whereby the pawl is operated to move the paper-carriage by the upward movement of the type-frame, as set forth.

12. In a type-writing machine of the character described, the paper-carriage H, provided with the inking-rollers I', in combination with the inking-tables H', and distributing-rolls L', whereby the type are supplied with ink and the printing effected without the use of an inking-ribbon.
95

13. In a type-writing machine, the combination, with the paper-bed, of the plate F' and screws G', for vertically adjusting said plate, as set forth.

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

THOS. D. WORRALL.

Witnesses:

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WM. W. HERRON.