

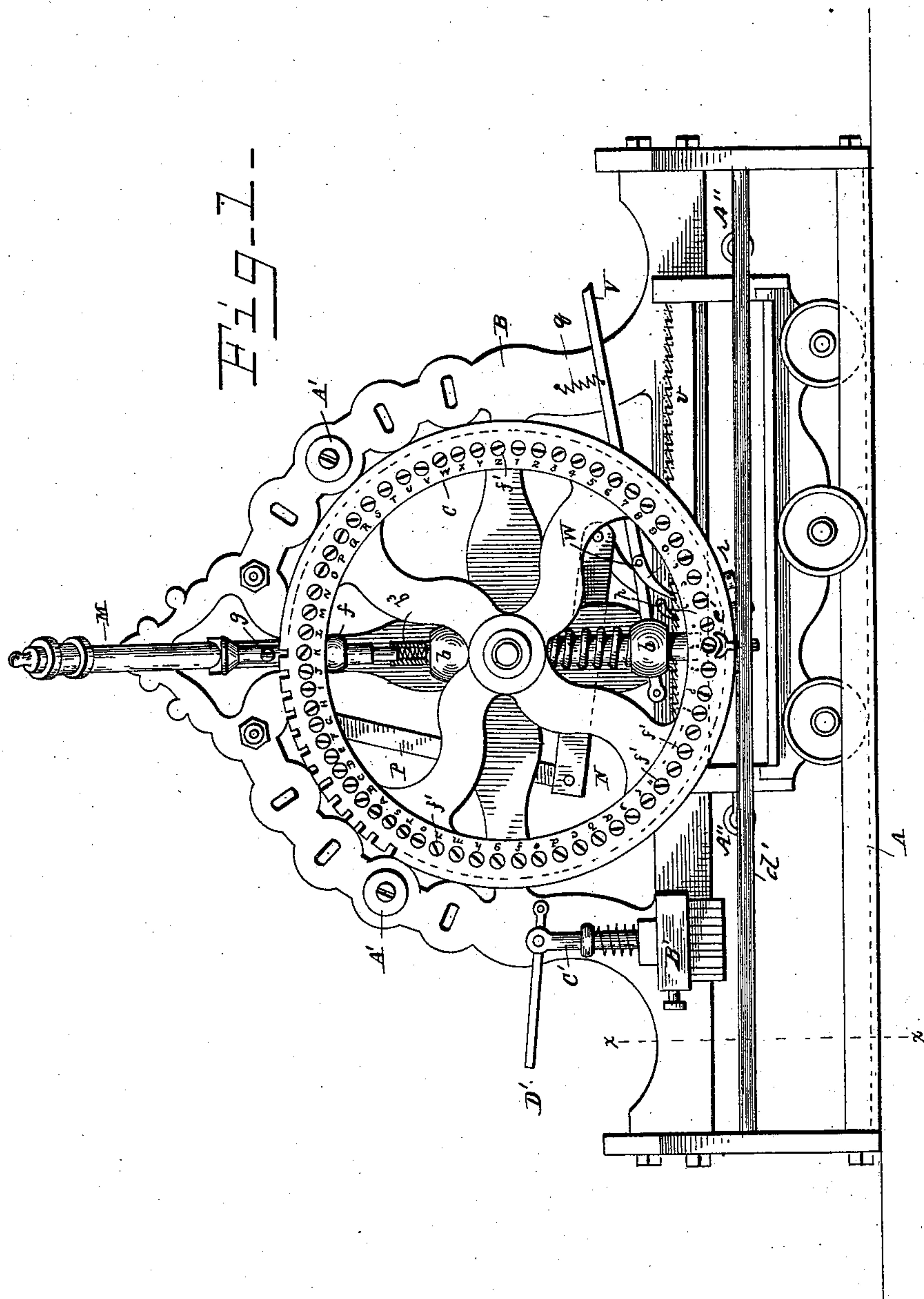
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3 Sheets—Sheet 1.

T. D. WORRALL.
TYPE WRITING MACHINE.

No. 363,932.

Patented May 31, 1887.



WITNESSES

Edwin L. Yewell
E. B. Turner

INVENTOR

Thomas D. Worrall

By *Ed Finsbaugh*
Attorney

Attorney

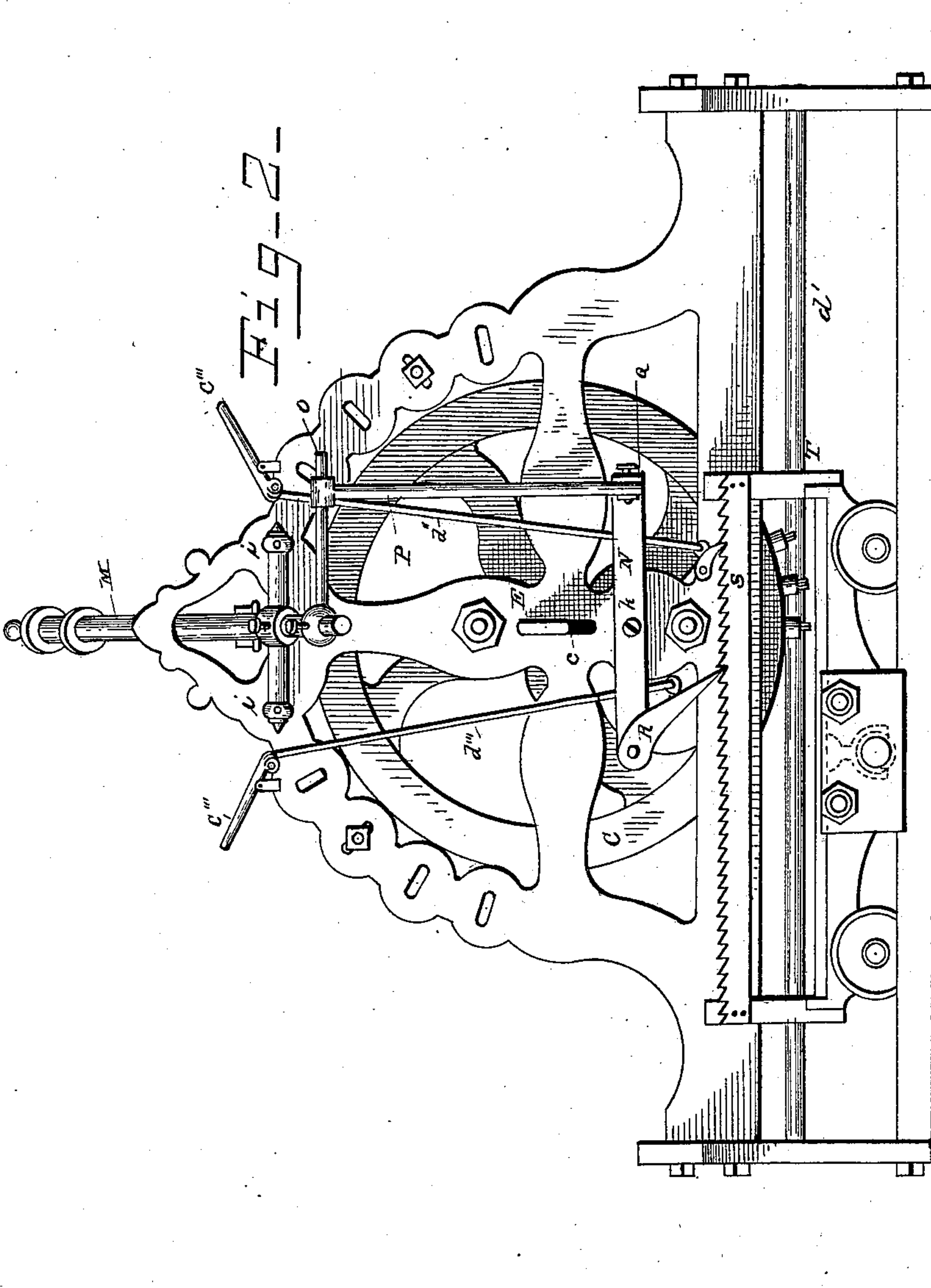
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WITNESSES
Edwin L. Yewell,
E. A. Tower

INVENTOR
Thomas D. Worrall
By *E. A. Ginsbaugh*
Attorney

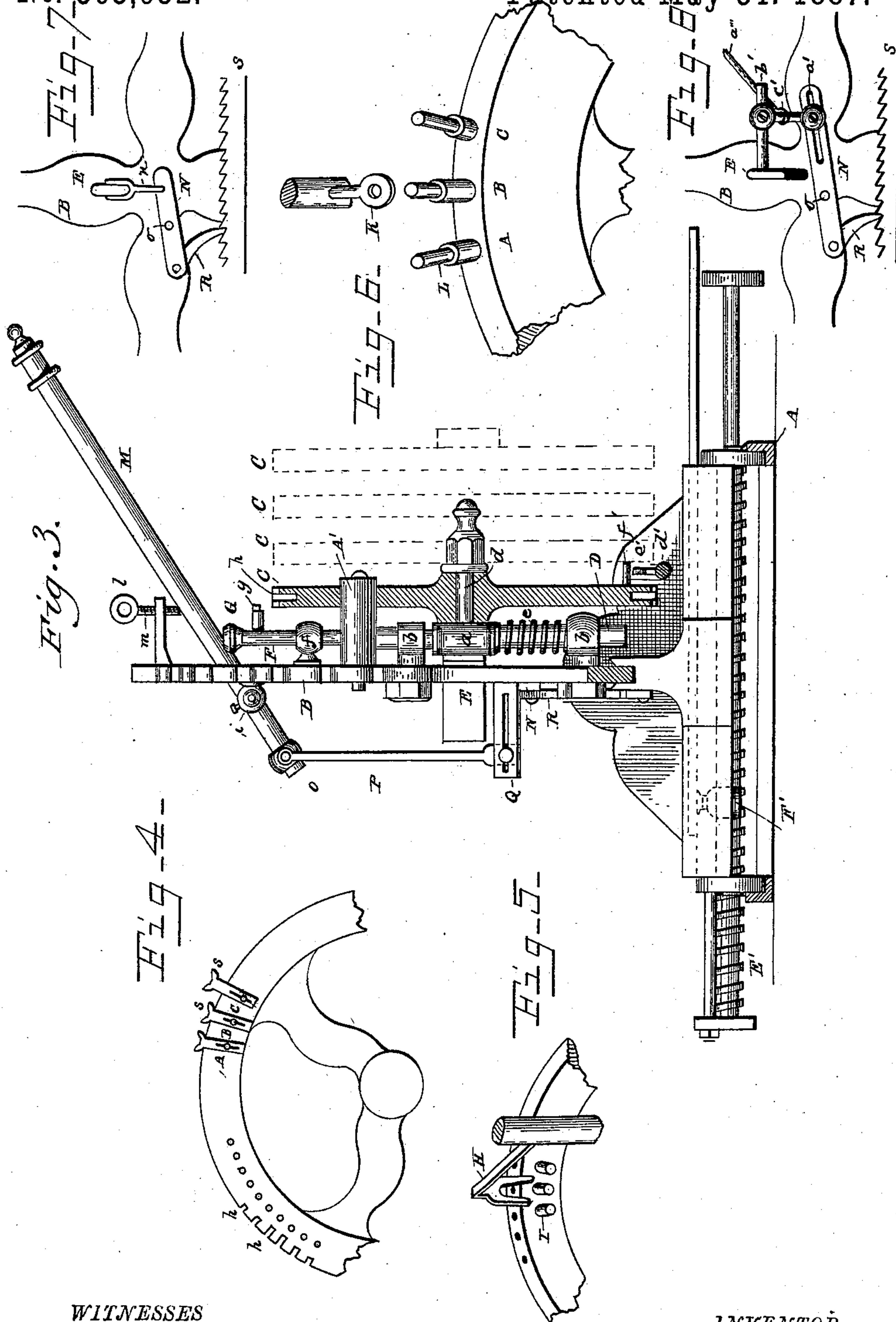
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WITNESSES

Edwin L. Yewell
E. H. Torrey

INVENTOR

Thomas D. Worrall

By *E. H. Torrey*

Attorney

UNITED STATES PATENT OFFICE.

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

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 363,932, dated May 31, 1887.

Application filed May 11, 1885. Renewed October 13, 1886. Serial No. 216,163. (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
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 or type-engraving machines.

The object of my invention is to construct a type-writing or type-engraving machine which will be strong in its action to form the impression, simple in its parts, and readily manipulated, even by inexperienced persons.
15

Referring to the drawings, Figure 1 is a front view of my machine. Fig. 2 is a rear view. Fig. 3 is a sectional end view on the line $x-x$ of Fig. 1. Fig. 4 is a front view of a segment
20 or portion of the type-wheel having the devices therein or attached thereto for regulating the throw of the impression-lever to operate the paper-carriage before the type are brought into printing contact with the paper
25 or other material. Figs. 5 and 6 are modifications of the devices shown in Fig. 4. Figs. 7 and 8 are front views of a portion of the supporting-frame and type-wheel, in which the paper-carriage is fed forward by the upward
30 movement of the type-wheel.

A is the frame of the machine, mounted on suitable supports or adapted to rest on a table or stand.

B is a bracket or cross-bar firmly secured at
35 each end in the frame of the machine, in which the type-carrying wheel C is mounted, as will more fully appear.

D is a bar provided with an enlarged portion, a , the upper and lower ends of which are
40 secured in the staples or supports b , which in turn are secured in the bracket or cross-bar B. The bar D is also provided with a rearwardly-projecting bar or lug, E, which passes through a slot, c , formed in the bracket, the office or
45 function of the bar or lug E being to guide and steady the bar D, so that it can be moved up and down in a true line.

d is a round bar or spindle, of any desired length, secured to the front side of the bar D,
50 and forms the axis of one or more type-carrying wheels, C, the end of said bar being pro-

vided with a screw nut or cap to prevent the type-wheels from coming off of the bar or axis.

e is a spiral spring, which is placed on the bar D, the lower end of which rests on top of
55 the lower staple, b , while the upper end impinges against the under side of the enlarged portion a of said bar, the office of said spring being to hold the type-wheels up and from contact with the surface to be printed or en-
60 graved.

F is a bar working in a staple, f , secured to the bracket B, the lower end of said bar being supported in a socket or recess formed in the upper end of the bar D. The bar F is pro-
65 vided with an arm or projection, G, having at its outer end a small or reduced portion, g , adapted to fit in recesses h , formed in the periphery of the type-wheel, or with a hook, H, to engage with pins I on the side of the type-
70 wheel, as shown in Fig. 5, or with a staple, K, to fit over the type-pins arranged in the periphery of the type-wheel, as shown in Fig. 6, the end of the pin or bar F being the centering-point on top of the type-wheel, while the let-
75 ter or character directly opposite or on the lower side of the type-wheel is at the printing-point.

b''' is a spring located in a cavity formed in the upper end of bar D, which returns the le-
80 ver M to an elevated position after the impression has been made, the cavity being deep enough to allow the arm g to come in contact with the wheel to depress the same.

M is a lever pivoted in bearings i in the rear
85 side of the bracket B, the front end of which rests in a recess formed in the top of the bar F, and by which means the bars F and D and type-wheel are depressed to bring the type into printing contact with the paper. The
90 rear end of the lever M is connected to one end of the pawl-operating lever N by means of the horizontal bar O and vertical bar P, said pawl-lever being provided with the arm Q and pivoted to the bracket B at k . R is a
95 pawl secured to the lever N and adapted to mesh with the rack-bar S, secured to standards on the paper-carriage T. From this construction it will be seen that when the outer or front end of the lever M is depressed the rear end will be raised, thus raising the end of the pawl-lever N and moving the paper-car-

riage one or more notches, as the case may be, the upward throw of the lever and the consequent moving of the pawl backward over the rack-bar being regulated by the thumb-screw
 5 *l*, secured in the arm *m*, and by which means the travel of the paper-carriage to effect the proper spacing of the letters is made. It will be noticed that by this method of spacing, the paper-carriage is moved by the downward
 10 movement of the lever *M* and type-wheel, thus causing the movement of the paper almost simultaneous with the printing action. This may in some cases be objectionable, for the reason that there is danger of blurring or mackling
 15 the paper. In order to obviate this objection and to effect the spacing alternately with that of the printing action, I connect the pawl-lever *N* directly to the bar *E* by means of the rod *n*, the pawl-lever being pivoted to the
 20 bracket *B* at *o*. It will be seen that as the type-wheel is forced up after the impression of the type on the paper has been effected, the free end of the pawl-lever will be raised up. The pawl *R* being in engagement with the rack-
 25 bar *S*, said bar and the paper-carriage to which it is connected will be moved over one or more notches, the distance being regulated by the set-screw *l*.

In Fig. 8 I have shown other devices for
 30 regulating the throw of the pawl-lever *N* to effect the spacing of the letters. I accomplish this by making a slot, *a'*, in the free end of the lever, and connect said lever to an arm, *b'*, secured to the bar *E*, by means of the adjust-
 35 able sliding bar or link *c'*, the throw of the pawl-lever being regulated by the distance the sliding bar or link *c'* is from the pivotal point *o* of the pawl-lever *N*, and this sliding bar may be connected in any suitable way to a lever
 40 or key, *a'''*, pivoted to the bracket *B*, which projects forward within easy reach of the operator, so that it can be moved back and forth to space for large and small letters.

U is a rack-bar secured to the paper-carriage in front of the bracket *B*, and *V* is a
 45 pawl-operating lever pivoted at one end to the bracket *B*, carrying the pawl *W*, which engages with the rack-bar *U*, so that by depressing the free end of the lever *V* the paper-carriage can be moved over as many spaces as
 50 required without depressing the type-wheel, and said carriage will be held in such forward position by the retaining-pawl *p*.

q is a spiral spring, one end of which is secured to the bracket *B*, while the other end is
 55 attached to the end of the pawl-lever *V*, and by which means the lever is raised when released from the hand of the operator and the pawl *W* drawn back another notch.

In the arrangement of the rack-bars *S* *U*, I
 60 place the teeth of one slightly forward of those in the other, and to operate on this rack I place the retaining-pawls so that the driving or operating pawl, hung in advance, is sure of
 65 advancing each tooth, so that the retaining-pawl will be sure to drop in place, and to prevent the recoil or movement of the paper-car-

riage when the operating-pawl is on the backward stroke, this being a matter of considerable importance in practical operation.

As before mentioned, *C* is the type-carrying
 70 wheel or disk, mounted on the axle *d*, so as to be readily turned around to bring the type into proper position to form the impression, the type *r* being arranged in the periphery of
 75 said wheel at right angles to its axis, and so arranged that one type-wheel can be readily removed and another placed in position; or several type-wheels bearing the same letters
 80 or characters, arranged in like order, may be mounted on the axis *d*, so that they will rotate together and be simultaneously depressed to effect the printing, thus enabling one to
 85 print any desired number of strips or ribbons at one and the same operation.

h h are recesses of varying depth arranged in the periphery of the wheel, into which the
 90 point *g* of the impression-bar *G* is placed before the operating-lever *M* is depressed, and by which arrangement the proper type is centered on the printing-point, said recesses being
 95 provided with letters, characters, &c., corresponding to the letter or character on the type-pin on the opposite side of the wheel; or a guide may be arranged on the lower part of the pe-
 100 riphery to center the type in the same manner as in the upper side of the wheel.

The variable depth of the notches *h* corresponds to the character of the letter to be
 105 formed—*i. e.*, for narrow letters the notches are shallow and for wide letters the notches are deeper—so that the varying spacing is effected in this arrangement by the downward
 110 movement of the lever *M*.

In making the impression of the narrow let-
 115 ters the pin or point *g* enters a shallow recess and comes in contact with the top of the type-wheel, forcing it down, and moves the paper-carriage one notch, while in the case of the
 120 wider letters, the notches being deeper, the pin or point *g* does not impinge on the type-wheel until the lever *M* has moved farther and operated the pawl-lever to effect the spacing for the wide letters. The same result is
 125 accomplished by the adjustable brackets or pieces *S*, (see Fig. 4,) secured to the side of the type-wheel, in which case the brackets for the narrow letters are set farther out from the periphery of the wheel than those for the wide
 130 letters. The pins *I* may be arranged in the same manner on the side of the type-wheel and produce like results. The same effect may also be produced by lengthening or shortening the type-holding pins, over which a loop may be made to pass, as shown at *L* and *K* in
 135 Fig. 6.

A' are ink-rollers, any desired number of which may be arranged on the bracket *B* in the path of the type-wheel *C*, so that the type will be properly inked by simply rotating or
 140 turning the type-wheel one revolution.

In order to print the heading of letters with the date, place of writing, and the signature of the person or firm writing or sending the

letter or copy, I set up the required type and secure them in the holder B', which is connected to the bar C', mounted in suitable bearings and operated by the lever D', said type
5 being inked by rollers attached to the type-carriage. By this arrangement I am enabled to write whole words or sentences at one operation.

The paper-bed is moved forward the required distance to space the lines of letters by means of the screw-shaft E', which is connected to the paper-bed by means of the half-nut F'.

For ordinary type-writing the downward movement of the wheel may be effected by the hand of the operator; but when it is desired to make the impression with considerable force the lever M is used.

In order to have a stop or guide near the printing-point, so that the operator can readily observe the progress of the work, I secure the bar d' in the ends of the frame A so it will be in a parallel line with and close to the front of the type-wheel C.

e' is a V-shaped lug secured to the bar at or near the center, and directly in front of the printing or impression point f' are pins secured in the side of the type-wheel directly above the type-pins, so that when the type-wheel is depressed the pins f' will enter the V-shaped lug e' and be guided by the inclined sides thereof, so that the type will be brought to the proper point before the impression is made. When the devices first described are
35 used for centering the type at the printing-point, the arm G on the bar F is dispensed with and the centering point or guide transferred to the bottom of the type-wheel or to a point near the paper-bed.

The levers e''' are connected to the operating and retaining pawls by rods d''', by which means said pawls are raised from engagement with the rack-bars.

I do not claim in this application a type-carrying drum having rows of type parallel with its axis, each row containing a different letter, but all the types or characters in any row being of the same letter, as this is embraced in an application filed by me September 7, 1885, Serial No. 176,311.

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

1. In a type-writing machine, a series of type-carrying wheels having the type arranged in the same order in their peripheries, the

axis of the wheels being at right angles to the direction of the feed of the carriage, and mechanism, substantially as described, for simultaneously depressing all the wheels, so as to make a number of simultaneous impressions, as set forth.

2. In a type-writing machine, a vertically-moving type-wheel having the type arranged in the periphery thereof, said wheel being provided with notches of different depths, or their described equivalent, in combination with an impression-bar engaging the notches in the wheel and an operating-lever connected, substantially as described, to the spacing-lever.

3. In a type-writing machine, a type-carrying wheel loosely mounted on an axis and adapted to be readily moved by hand to bring the proper type into printing position, in combination with a lever pivoted independently of and connected to the type-wheel, substantially as described, so as to force said type-wheel into printing contact with the paper.

4. The type-wheel, the vertically-moving bar D, and the extension or supplemental bar F, seated in the upper end of bar D and provided with an impression-bar to impinge on the top of the type-wheel, in combination with a suitable lever for bringing the impression-bar in contact with the type-wheel, as set forth.

5. In a type-writing machine, a vertically-moving and spring-operated type-wheel, the supporting-bar of which is provided with an extension, E, and a pawl-operating lever adjustably connected to the extension E by means of the arm b' and sliding link c', whereby variable movement of the paper-carriage is effected by the upward movement of the type-wheel.

6. In a type-writing machine, the combination, with the paper-carriage, of two rack-bars secured, one in advance of the other, to the said carriage, mechanism, substantially as described, by which the one set in advance of the other is operated to move the paper-carriage automatically by the upward movement of the type-wheel, and lever V and pawl W, by which the other rack-bar is operated independently of the movement of the type-wheel.

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

THOS. D. WORRALL.

Witnesses:

N. D. ADAMS,
MARY BARKER.