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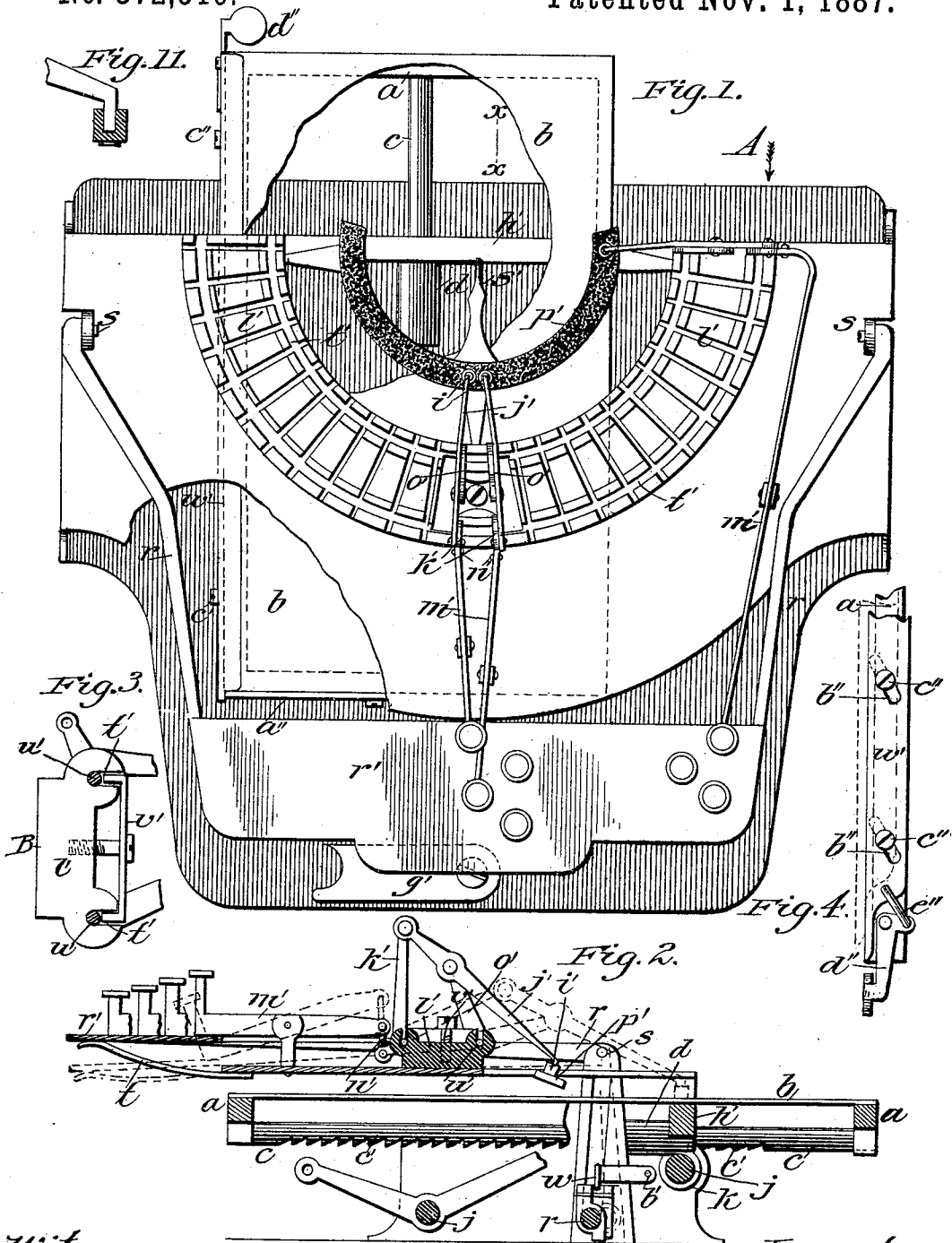
2 Sheets—Sheet 1.

A. W. CASH.

TYPE WRITING MACHINE.

No. 372,516.

Patented Nov. 1, 1887.



Witnesses.  
 Chas. H. Baker.  
 Allen M. Long

Inventor.  
 Arthur W. Cash,  
 by Simonds & Burdett,  
 Atty.

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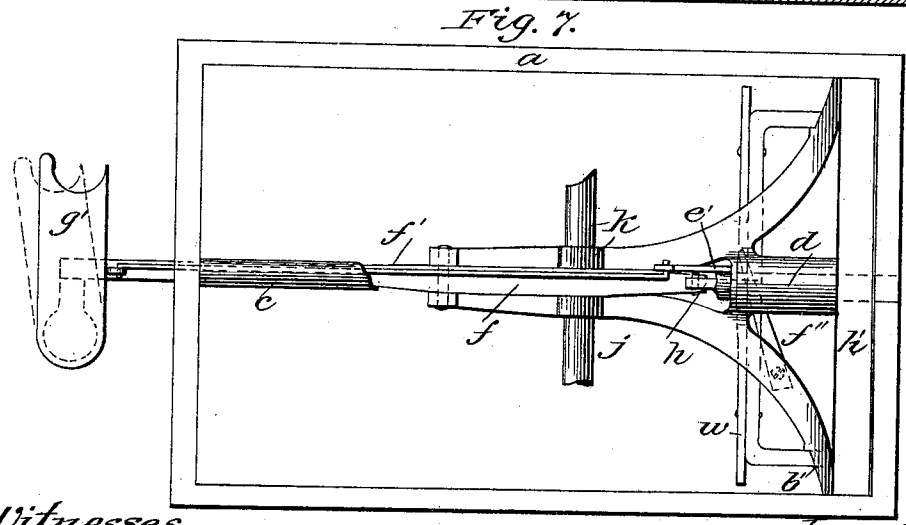
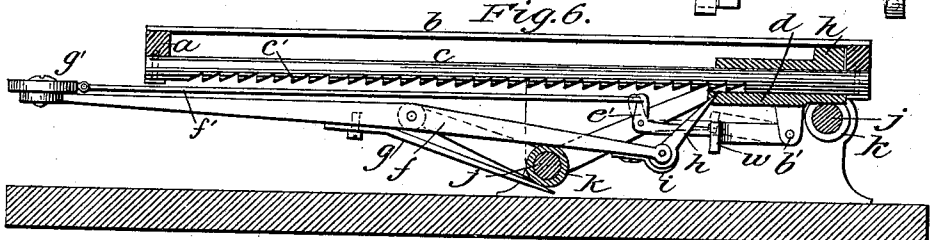
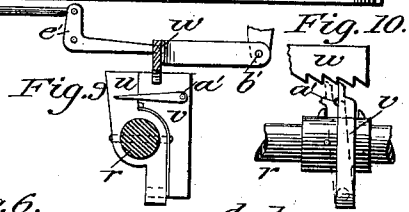
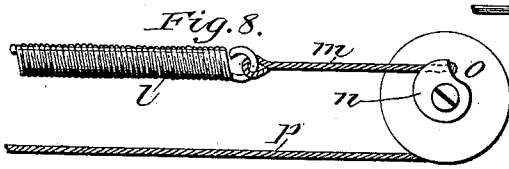
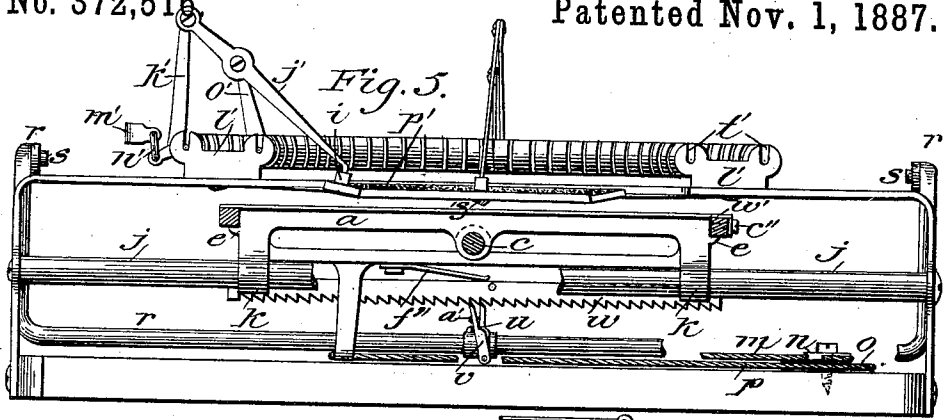
2 Sheets—Sheet 2.

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# UNITED STATES PATENT OFFICE.

ARTHUR W. CASH, OF HARTFORD, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE TYPOGRAPH COMPANY, OF SAME PLACE.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 372,516, dated November 1, 1937.

Application filed April 24, 1886. Serial No. 200,107. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR W. CASH, of Hartford, in the county of Hartford and State of Connecticut, have invented a certain new and useful Improvement in Type-Writing Machines, of which the following is a description, reference being had to the accompanying drawings, wherein—

Figure 1 is a plan view of a type-writer embodying my improvements. It shows only three of the key-levers and type-levers, and the central part of the platen is represented as broken away. Fig. 2 is practically a view in vertical central section on the plane denoted by the broken line  $x x$ , with some parts represented as broken away and some parts as absent, this for the purpose of making location and arrangement of other parts clear. Fig. 3 is a detail view from substantially the point A, Fig. 1, of the base-piece, in which are pivoted the lower ends of the levers, to the upper ends in which the type-bars are pivoted, the side B being the base thereof. Fig. 4 is a detail side view of the clamping arrangement by which the paper is clamped to the platen. Fig. 5 is a rear elevation view of the machine, meaning by "rear" the side opposite the operator. In this view the platen is shown in vertical cross-section. Fig. 6 is, in substance, a view in central vertical longitudinal section on the plane denoted by the dotted line  $x x$ , showing only the parts which are below the surface of the platen. Fig. 7 is a top or plan view of the platen-carriage and appurtenances. Fig. 8 is a detail plan view of the device which propels the platen laterally when the printing is going on. Fig. 9 is a side detail view of the detent device. Fig. 10 is a rear elevation view of the detent device. Fig. 11 is a detail view showing the mode of attaching the types to the type-bars, the types being in section, scale enlarged.

The letters  $a b$  denote the platen as a whole.  $a$  denotes the platen-frame, and  $b$  denotes a diaphragm, of enameled leather or other suitable material, stretched upon this platen-frame, and serving as a table or surface on which lies the sheet of paper to be printed upon.

$e$  denotes what I will term the "platen-rod,"

running from end to end of the platen-frame and through the sleeve  $d$ , which thereby serves as a guide-block for the longitudinal reciprocation of the platen. The platen has, also, side supports,  $e$ . Sleeve  $d$ , united to support  $e$ , forms a platen-carriage.

In the within description and accompanying drawings a platen or movable table having a flat surface is shown and described as a paper-support; but I do not limit myself to the specific construction thus shown. A ratch,  $c'$ , is formed on the under side of the platen-rod  $e$ , and is a part of the arrangement for giving the platen its step-by-step longitudinal movement.

The letter  $f$  denotes the line-spacing lever with its outer and longer end held up to normal position by spring  $g$ . This lever  $f$  bears at its rearward end the spring-pawl  $h$ , held upward to a normal position by a spring,  $i$ . The spring  $g$  holds the pawl  $h$  normally out of engagement with the ratch  $c'$ . The spring-pawl  $h$  co-operates with the ratch  $c'$ , when the forward end of the lever  $f$  is pressed down, with the effect of pushing the platen rearward a single line-space by a single depression of the line-spacing lever. Obviously, the platen can at any time be pulled forward any desired distance within the limits of the longitudinal motion that the device has when the lever is not depressed to cause the engagement of the pawl  $h$  with the ratchet  $c$ . The platen-carriage moves back and forth laterally on the lateral guide-rods  $j$ , being provided for that purpose with sleeves  $k$ , which take hold of these guide-rods. The spring  $l$  propels the platen laterally when the printing is going on. From this spring  $l$  runs a cord,  $m$ , upon and around the cam  $n$ , which is made cam-shaped for the purpose of equalizing the propelling power of the spring at the different parts of the lateral travel of the platen. This cam  $n$  is practically one with the pulley  $o$ , which is larger than the cam just mentioned, and to its periphery is attached a cord,  $p$ , which runs to (a projection from) the platen-carriage. (See Figs. 5 and 8.) This arrangement of spring, cord, cam, pulley, and cord constitutes, as already indicated, the force and device for propelling the platen laterally when printing

is going on. As this lateral motion when the printing is going on is necessarily a step-by-step movement, I interpose a detent device to effect that end, which I will now describe.

5 The letter *r* denotes a device which I will term the "detent-lever," pivotally hung at pivots *s*, extending forward and there broadened into the pad *r'*, which underlies all the keys, so that when any key is depressed the front end of the detent-lever is depressed, both the pad and key being returned to place vertically by the spring *t*. The rearward part of this detent-lever bears the escapement device, made up of the fixed pawl *u* and the pivoted spring-pawl *v*. (See Figs. 5, 9, and 10.) When the parts are in the normal position of rest, the pivoted spring-pawl *v* is engaged with the lateral ratch *w*, appurtenant to the platen. When the front end of the detent-lever is depressed, the spring-pawl *v* is swung rearward out of engagement with the ratch last mentioned, and the fixed pawl *u* is swung into its place and into engagement with that ratch, in both cases, such engagement preventing the spring *l* from actuating the platen. As the spring-pawl *v* is thus disengaged from the ratch *w*, and the fixed pawl *u* is thrown into engagement therewith, the spring *a'* throws the top of the spring-pawl *v* one step to the left. Now, on permitting the forward end of the detent-lever to rise, the fixed pawl just referred to is swung forward out of engagement with the ratch *w*, and the spring-pawl *v* is thrown into engagement with the next tooth, when the spring *l* (being stronger than the spring *a'*) immediately pulls the platen one step laterally and into the position for permitting the paper to receive the imprint of the next letter. When in the progress of this step-by-step lateral feed of the platen the end of a line has been reached, and it is desired to move the platen laterally the length of a line or less backward, it is attained by means as follows: The ratch *w* is pivoted, by arms at the ends, on the pivots *b'*, and kept down normally by spring *f''*, so that the ratch can be raised and lowered somewhat. The letter *e'* denotes a cranked lever, co-operating at one end with the ratch *w* and to its other end there is affixed a pull-wire extending to the finger-lever *g'*, by the operation of which the lateral ratch *w* is lifted out of contact with the pawls last referred to, so that the operator can readily move the platen and its carriage laterally, he, for this purpose, utilizing the line-spacing lever *f*, and pulling sidewise upon it.

The surface of the platen has been described as practically a flexible diaphragm. Underneath it and borne on top of the sleeve *d* is a supporting-bar, *h'*, which I will call a "platen-bar," which is underneath the line where the printing is being done, and supports the said diaphragm and the paper upon it firmly on that line, as obviously is necessary to receive the impact of the types.

Each type, *i'*, is borne on the end of a type-

bar, *j'*. Each type-bar is jointed or pivoted at the opposite end to a bent lever, *k'*, which is pivoted at the angle or bend in the pivot-base *l'*, and at its forward end is jointed or pivoted to a key-lever, *m'*, through the medium of a link, *n'*. Intermediate of its two ends each type-bar is jointed or pivoted to a walking-bar, *o'*, which walking-bar is also pivoted in the pivot-base. Each of the types *i'* has a cylindrical socket in the end opposite the printing-face, as shown in Fig. 11, and into this socket is tightly fitted a corresponding tenon on the end of the type-bar. This mode of attachment allows the type to be adjusted with reference to the plane of motion of the type-bar, so that it will print upright when it strikes the paper, and it also allows of the ready attachment to and removal of the types from the type-bars. In the normal position of rest the front ends of the key-levers are kept raised by the spring *t* under the pad *r'*, as already mentioned, and in this normal position of rest the types rest on the inking-pad *p'*. When a key-lever is depressed, its corresponding type starts from the inking-pad and travels by a path approaching elliptical in its direction, and strikes squarely upon the paper which is upon the platen, leaves its imprint, and the key-lever, being released, returns to the inking-pad. The printing-point is of course the same for all the types, being the point directly in front of the pointer *s'*. The pivot-base *l'* is preferably all in one piece, and contains pivot-grooves *t'*, which receive the pivot-rods *u'*, which are held to place by the clamps *v'*. Each of the clamps *v'* consists of a plate having its ends bent down, so as to fit into the groove upon the wire, where it is held in place by a screw passed into the base *e'*.

The paper is clamped upon the platen by means of the clamp *w'*, pressed to contact with the platen by spring *a''*. This clamp being an angular strip of metal lying along the edge of the platen with one flange adapted to grasp the paper and having inclined slots *b''* through the other, the pins *c''*, that are fast to the platen-frame and pass through the slots, serving as guides to control the motion of the clamp when the lever *d''*, which is connected to the clamp by means of the link *e''*, is depressed.

As is readily obvious, the types are arranged in a horizontal semicircle and the inking-pad is in a horizontal semicircle.

I claim as my improvement—

1. In a type-writer, in combination, the supporting bed or frame, the platen-carriage movable laterally across the frame, the platen borne on the platen-carriage and movable along it across the line of movement of the carriage, the ratch *e'*, fast to the platen, the platen-feed lever *f*, bearing the spring-pawl *h*, adapted to engage the teeth of the ratch, and the spring *g*, whereby the pawl *h* is held normally out of engagement with the ratch, all substantially as described.

2. In combination, the platen, the spring-

clamp *w'*, the lever *d''*, and the link *e''*, substantially as described, and for the purpose set forth.

3. In a type-writing machine, in combination with a laterally-movable platen-carriage, the ratch *w*, pivoted thereto, the detent-lever *r*, having the pad *r'*, and bearing the escapement with its teeth co-operating with those on the ratch-bar in limiting the movement of the platen-carriage, the bent lever *e'*, pivoted to the platen-carriage, the pull-wire *f'*, joined to said lever *e'* and to the finger-lever *g'*, and the said finger-lever *g'*, pivoted to the outer end of the lever *f*, that is secured to the platen carriage, all substantially as described.

4. In combination, the platen, the platen-

rod *c*, the sleeve *d*, and the side supports, *e*, all substantially as described, and for the purpose set forth.

5. In combination, the platen, platen-rod *c*, sleeve *d*, the supports *e*, the lateral guide-rods *j*, and the sleeves *k*, all substantially as described, and for the purpose set forth.

6. In combination, the platen, the pivoted lateral ratch *w*, the lever *e'*, pull-wire *f'*, and finger-lever *g'*, mounted on the line-space lever, all substantially as described, and for the purpose set forth.

ARTHUR W. CASH.

Witnesses:

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E. P. PELTON.