(No Model.) 2 Sheets—Sheet 1.

E. A. FORD.

TYPE WRITING MACHINE.

No. 472,870. Patented Apr. 12, 1892.

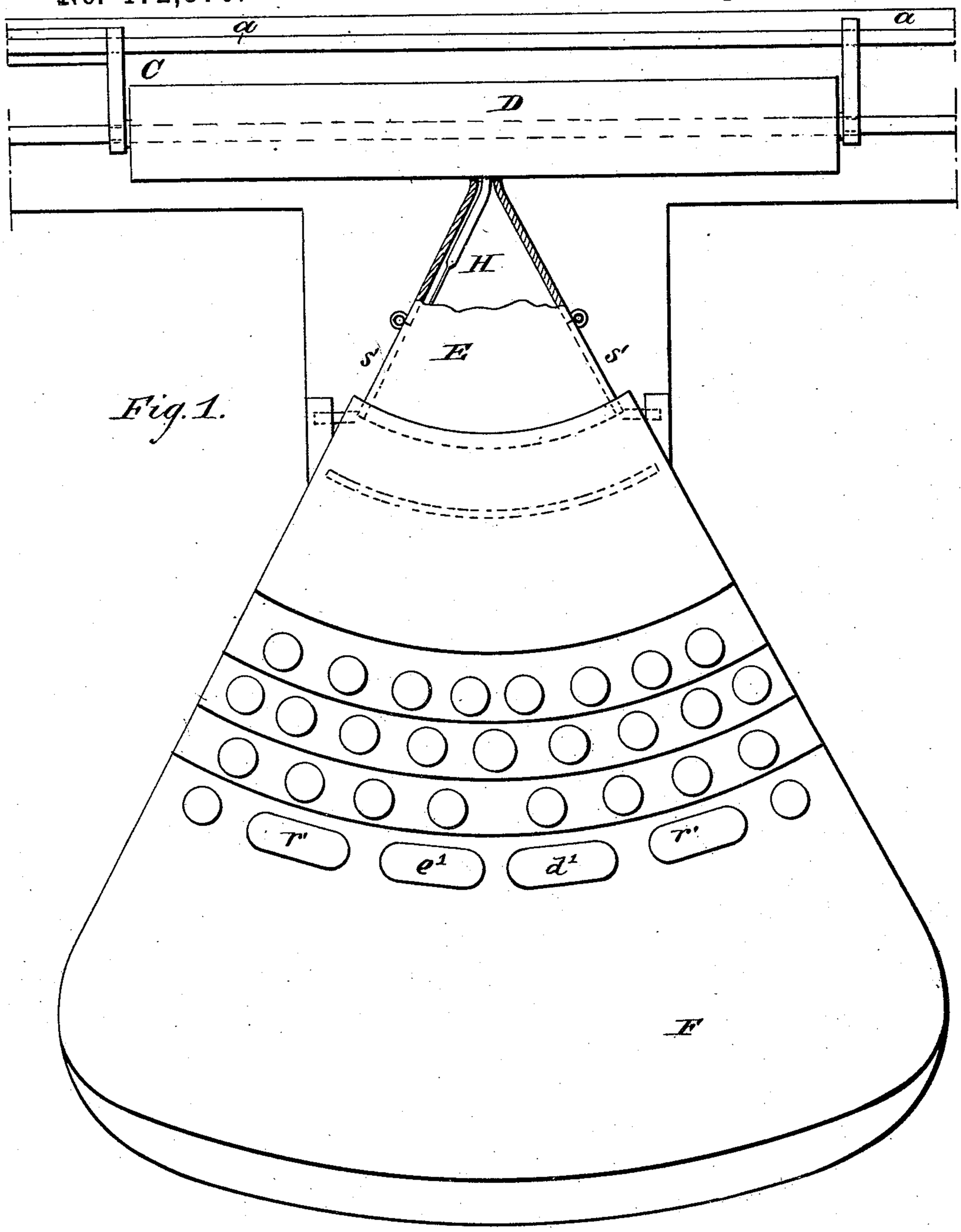

Fig. 1.

WITNESSES:

Donn Fortchell

C. Sedgwick

INVENTOR:

E. A. Ford

BY Munn & Co.

ATTORNEYS

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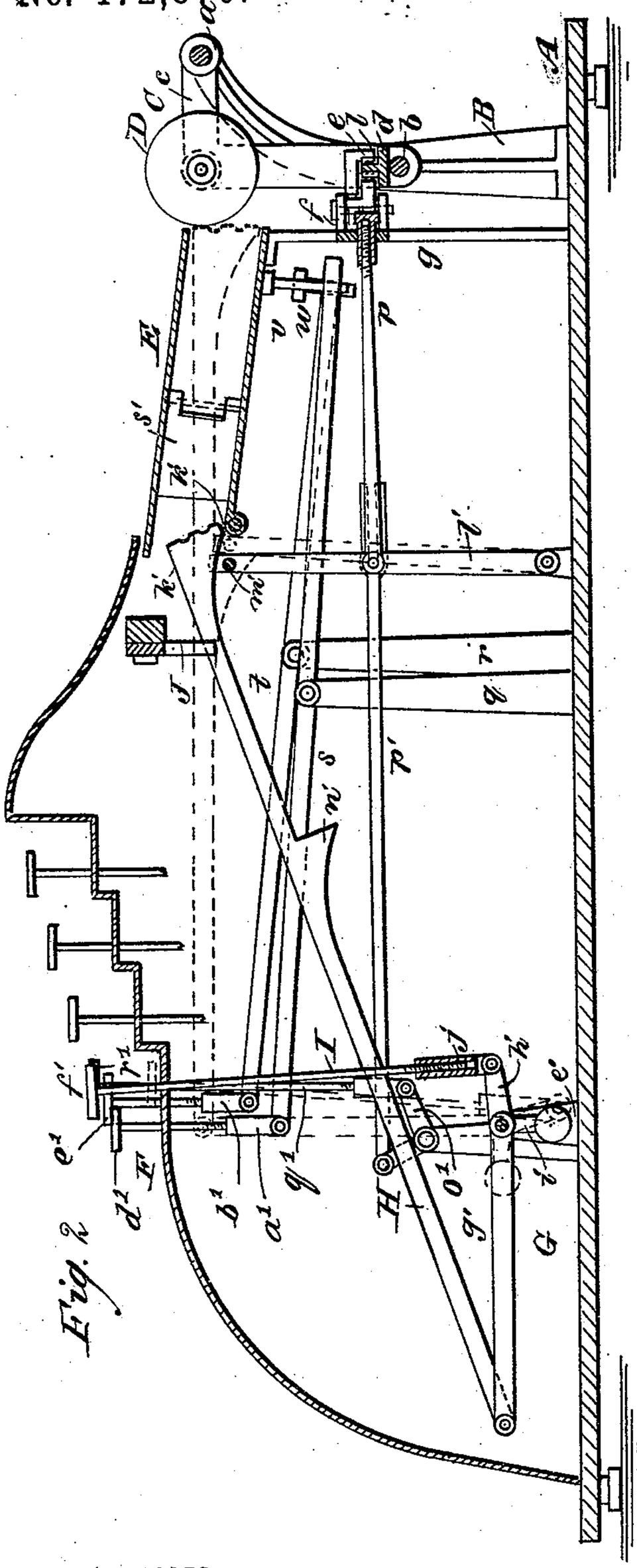

Fig. 2.

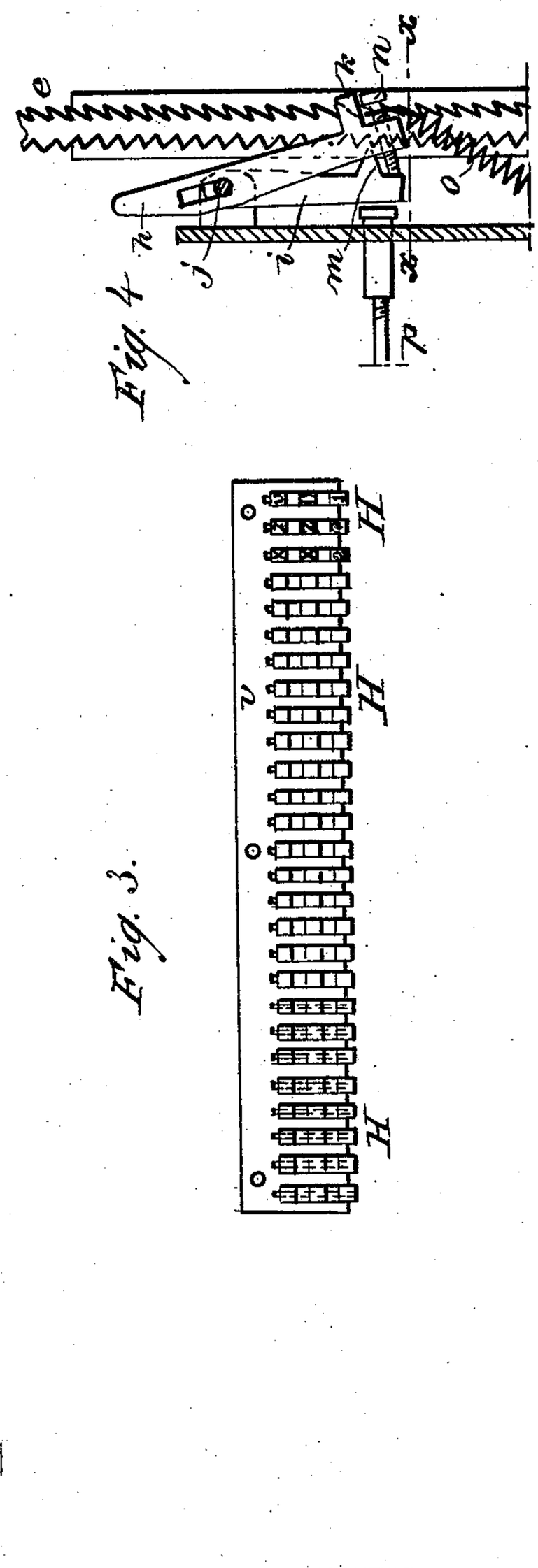

Fig. 4.

Fig. 3.

WITNESSES:

Donn Twitchell

C. Sedgwick

INVENTOR:

E. A. Ford

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

EUGENE A. FORD, OF NEW YORK, N. Y.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 472,870, dated April 12, 1892.

Application filed June 15, 1891. Serial No. 396,215. (No model.)

To all whom it may concern:

Be it known that I, EUGENE A. FORD, of New York city, in the county and State of New York, have invented a new and Improved Type-Writing Machine, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a plan view, partly in section, of my improved type-writing machine. Fig. 2 is a vertical longitudinal section. Fig. 3 is an end elevation of the type-bars, showing the type-bar guide; and Fig. 4 is an enlarged plan view of the carriage feeding mechanism.

Similar letters of reference indicate corresponding parts in all the views.

The object of my invention is to construct a simple and efficient type-writing machine in which the type-bars will be made to register accurately and in which a large number of characters may be printed with few keys.

My object is further to provide a simple and efficient quick-acting carriage feeding mechanism.

My invention consists in the combination and arrangement of parts, as hereinafter described, and pointed out in the claims.

To the base A, which supports all the working parts of the machine, are attached rearwardly-curved pillars B, supporting rods *a b*, and upon the said rods are loosely placed the end pieces *c* of the frame of the paper-carriage C. In the said frame is supported the paper-supporting roller D. The end pieces *c* are connected by a longitudinal bar *d*, carrying a double rack-bar *e*. Between ears *f*, projecting rearwardly from the support *g*, are placed the pawls *h i*. The said pawls are held in place by a pin *j*, projecting through the ears *f* and through a circular hole in the pawl *i* and an oblong hole in the pawl *h*. The pawl *h* is provided with a right-angled arm *k*, furnished with a downwardly-projecting V-shaped finger *l*, which engages the teeth of the rear surface of the rack-bar *e*. The pawl *i* is furnished with a V-shaped finger *m*, which engages the forward side of the rack-bar *e*. In the pawl *h*, near its free end, is inserted an adjusting-screw *n*, which normally rests upon the side of the pawl *i* at its free end. The pawl *h* is held in engagement with the teeth of the rear side of the rack-bar by a spiral spring *o*, connected with the pawl and with a fixed support. The pawl-and-ratchet mechanism is operated by a rod *p* in the manner presently to be described.

To a fixed support in front of the paper-supporting roller D is pivoted a triangular type-bar guide E, the smaller end of the guide, adjoining the paper-supporting roller D, being provided with an opening of the width and height of the end of one of the type-bars. The narrower end of the guide E normally rests upon the top of the support *g*, so that the guide is used in this position while printing the frequently-recurring letters and characters. In standards *q r*, attached to the base A, are pivoted levers *s t*, provided at their rear ends with studs *v w* for engaging and lifting the type-bar guide E. The stud *w* is made shorter than the stud *v*, so that when the lever *t* is tilted and the stud is raised until the free end of the lever *t* strikes the angled upper end of the support *g* the type-bar guide E will be raised sufficiently to bring the central letter or character on the end of the type-bar into position for printing. In a similar manner the longer stud *v*, carried by the lever *s*, will raise the type-bar guide E when the said lever is moved, so as to bring the lower character on the end of the type-bar into position for printing. The forward ends of the levers *s t* are connected with rods *a' b'*, which extend upwardly through the casing F of the machine, and are provided at their upper ends with finger-pieces *c' d'*, so that by pressing these keys the type-bar guide may be raised in the manner described.

In standards *e'*, secured to the base A near the front thereof, are pivoted the key-levers G, which are connected with type-bars H and with rods I, extending through the casing F and provided at their upper ends with finger-pieces *f'*. As all of the type-bars, type-operating levers, and parts connected therewith are alike in all respects as to position in the machine and the form of their free ends, a description of one bar and the mechanism connected therewith will answer for the whole.

The lever G is formed of the longer arm *g'*, the shorter arm *h'*, and the weighted arm *i'*, extending approximately at right angles in

the main portion of the lever opposite the pivotal point. The shorter arm h' is pivotally connected with the internally-threaded sleeve j', into which is screwed the threaded lower end of the rod I. The free extremity of the longer arm g' of the lever G is pivotally connected with the type-bar H, and the said type-bar extends forward and projects into the forward end of the guide E. In front of the guide E is supported a slotted plate or comb J, which receives in each of its slots a type-bar, as shown in Fig. 3.

The free end of the type-bar H is widened, and in the present case carries type for producing three letters or characters. Either of the characters may be brought into position for printing by tilting the guide E in the manner already described. To permit of this movement of the guide and at the same time to preserve the alignment of the type, the end of the type-bar is provided above and below with convex projections k'. The rod p of the carriage-feeding mechanism is pivoted to a portion of the lever l', which turns on fixed pivots in the lower part of the machine-casing, and connected at their upper ends by a rod m'. The said rod lies in the path of a projection n' on the lower edge of the type-bar, so that as the type-bar is moved forward the impact of the projection n' on the rod m' moves forward the rod p, which pushes the pawl i forward, so as to bring the projection m into engagement with the teeth on the front side of the ratchet-bar e, at the same time, through the medium of the screw n, pushing the triangular finger l out of engagement with the ratchet-teeth on the back side of the bar e, thereby releasing the bar from the pawl h and causing it to be held by the pawl i. At the same time the spring o draws the pawl h forward ready for re-engagement with the ratchet-bar after its release, which occurs when the rod p moves forward, allowing the pawl i to slip out of engagement with the ratchet-bar. The carriage after the release of the ratchet-bar in the manner described is moved forward one notch by a spring or weight in the usual way.

To provide for spacing without printing, an angled lever o', pivoted in a standard projecting from the base A, is connected at one end by a rod p' with the levers l', and is pivotally connected at the other end with the rod q', which extends upwardly through the casing and is furnished with a finger-piece r'. Whenever it is desired to space without printing, the pressure of the finger upon the finger-piece r' tilts the lever o', pushes forward the rod p', and releases the feeding mechanism in the manner already described. An inking-ribbon of the usual description will be interposed between the type-bar guide E and the paper supported by the roller D.

To facilitate cleaning the type, the sides of the type-bar guide E are provided with hinged doors s', which may be opened for the introduction of a brush. The central type-bars are made straight; but the lateral ones are curved slightly to accommodate them to the type-bar guides.

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

1. In a type-writing machine, the combination of a series of type-bars H, the fixed slotted guide J, the triangular type-bar guide E for causing the type-bearing ends of the type-bars to register, and the type-bar-actuating mechanism consisting of levers G, rods I, and finger-pieces f', substantially as specified.

2. The combination, with the horizontal platen, of the vertically-swinging hollow guide having its sides converging toward the platen, levers acting against the lower side of the hollow guide to raise it into two new positions, a series of type-bars having vertically-aligned type or characters on their forward ends, and operating devices for projecting the type-bars forwardly through the hollow guide and its contracted forward end into contact with the platen or paper thereon, substantially as set forth.

3. In a type-writer, the combination, with a series of type-bars converging at their forward ends, each provided with vertically-aligned type or characters, and keys having a lever connection with the rear ends of the bars, of a hollow vertically-swinging guide hinged at its rear end and having a contracted opening at its forward end of a size to firmly guide the forward end of a single type-bar, vertically-swinging levers beneath the said hollow guide and constructed to raise its forward end into two new positions, and a key mechanism adjacent to the keys of the type-bars to be operated simultaneously therewith or separately and connected with the guide-elevating levers, substantially as set forth.

4. The combination, with a series of horizontal levers pivoted near their forward ends, a series of converging type-bars pivoted at their lower ends to the long arms of said levers and inclined upwardly and forwardly therefrom, vertically-aligned type or characters on the forward end of said bars, and a series of vertically-extending key-rods pivoted at their lower ends to the forward ends of said levers to raise the type-bars into a horizontal position and project them forwardly to a common printing-point, of a vertically-swinging hollow guide pivoted at its rear end adjacent to the upper forward ends of the type-bars, and levers acting on the said hollow guide to elevate its free end into two new positions, substantially as set forth.

5. The combination, with the inclined converging type-bars, each having on its forward end vertically-aligned type or characters, the keys connected with said bars, and a stationary bar having vertical slots, through which the converging upper ends of the type-bars pass, of a vertically-swinging hollow guide pivoted at its rear end adjacent to the upper forward ends of the type-bars and tapering

forwardly to receive and firmly guide the printing end of a single type-bar, and key-actuated levers acting on the lower side of the hollow guide to raise it into two new positions, substantially as set forth.

6. The combination, with the vertically-swinging hollow type-bar guide and a rest limiting the downward movement of its forward end, of the vertically-swinging key-levers extending forwardly under said guide and beneath its rest to engage the latter when their forward ends are swung up, and upwardly-projecting studs on the forward ends of said levers and one projecting higher than the other to engage the lower side of the hollow guide and raise its forward end into two new positions, substantially as set forth.

7. The combination, with the paper-carriage, its spacing mechanism having a key-operated rod, and intermediate vertical levers pivoted between their ends to the said rod and connected at their upper ends by a cross bar or rod, of the inclined type-bars crossing at their forward ends the said cross-bar and having depending lugs to engage it and rock the vertical levers forwardly to actuate the spacing mechanism, vertically-aligned type or characters on the forward ends of the said bars, keys for actuating the type-bars, and a vertically-swinging hollow guide contracted at its forward end to form a common printing-opening and pivoted at its rear end adjacent to the upper ends of the type-bars, and key-operated levers acting on the lower side of the hollow guide to raise its forward end to two new positions, substantially as set forth.

8. In a type-writing machine, the combination of the type-bars H, provided with projections n', the levers l', and pawl-and-ratchet mechanism connected with the paper-carriage and arranged to be operated by the impact of the type-bar through the levers l' and their connections, substantially as specified.

9. In a type-writing machine, the combination, with the paper-carriage and printing mechanism, of the double ratchet-bar e, attached to the paper-carriage, the pawl i, adapted to engage one side of the ratchet-bar, the slotted pawl h, adapted to engage the opposite side of the ratchet-bar, the adjusting-screw n, inserted in the pawl h and bearing upon the pawl i, and the retractile spring o, connected with the pawl h and with a fixed support, substantially as specified.

E. A. FORD.

Witnesses:
C. SEDGWICK,
E. M. CLARK.