No. 644,187. Patented Feb. 27, 1900.

C. SEARS.

TYPE WRITING MACHINE.

(Application filed Nov. 9, 1898.)

(No Model.) 3 Sheets—Sheet 1.

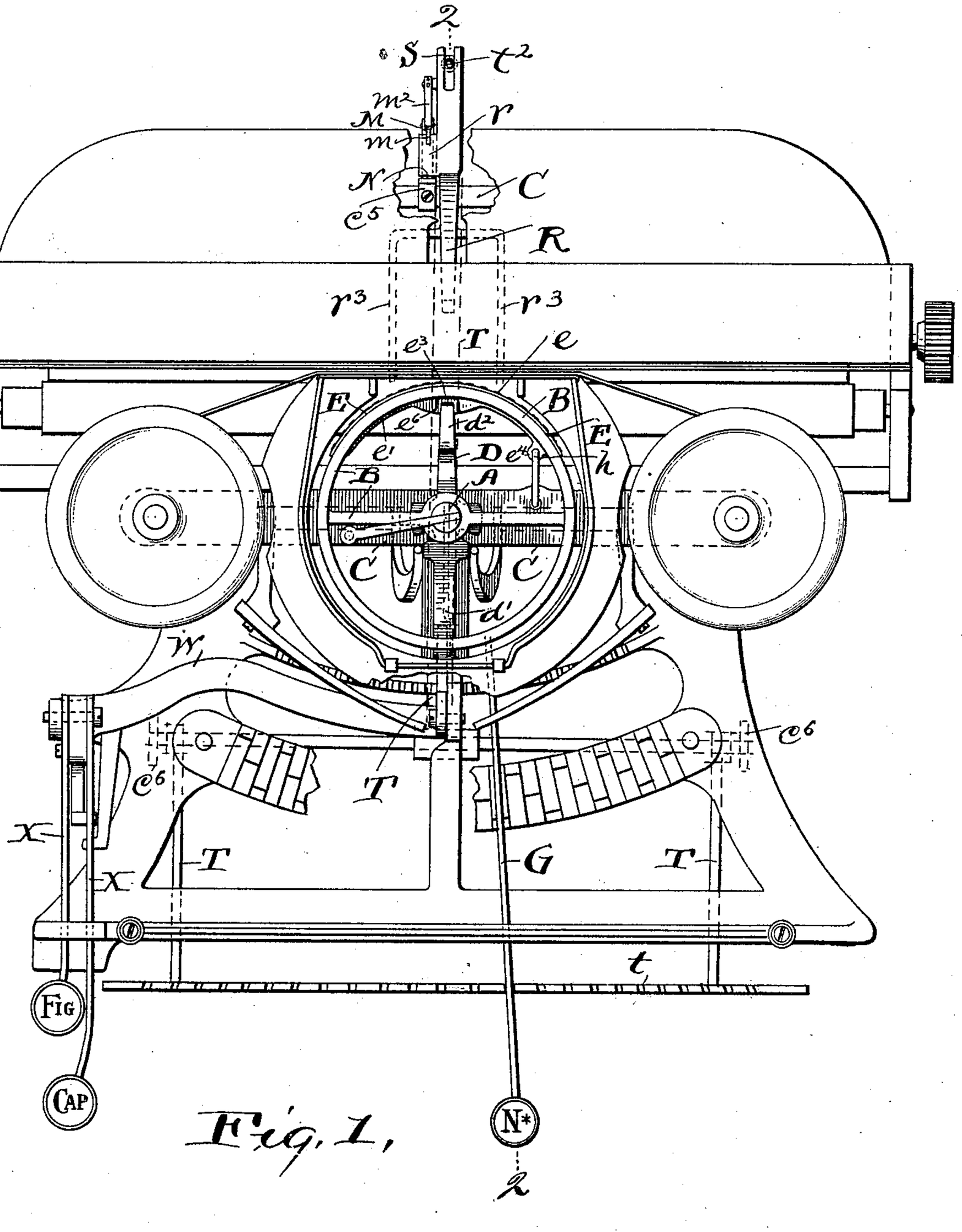

Fig. 1.

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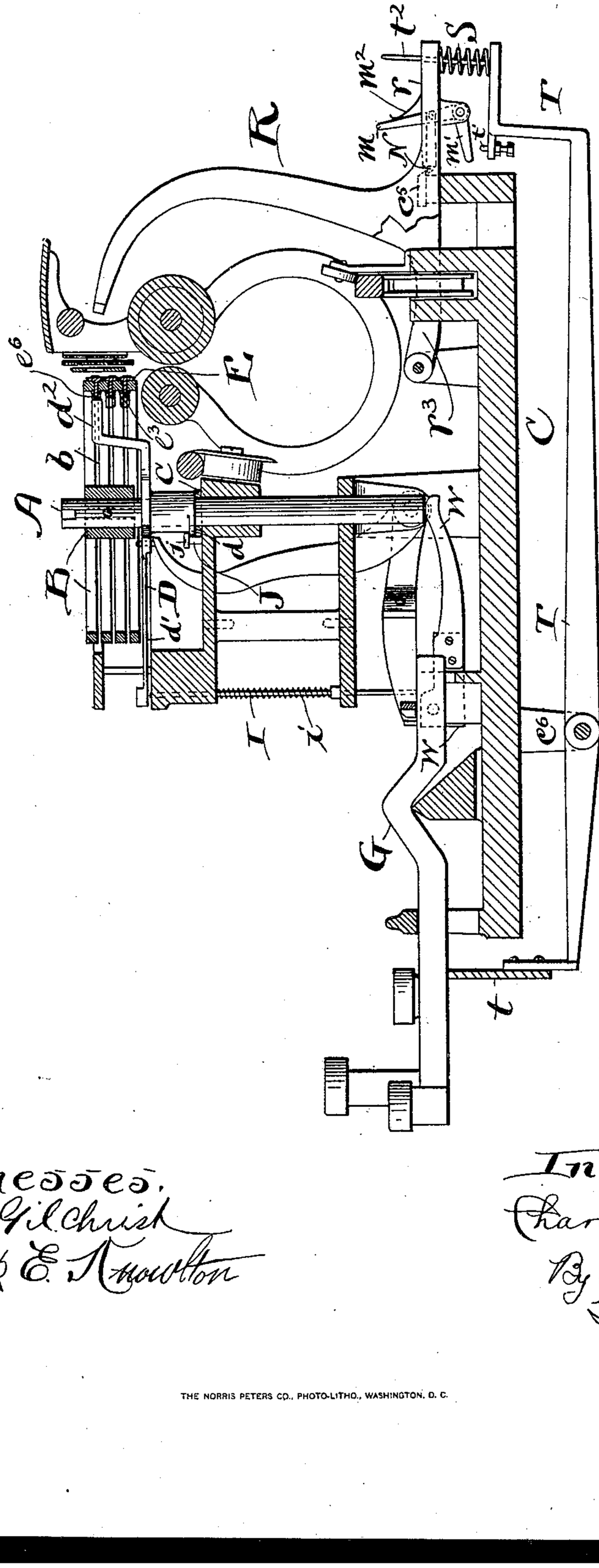

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C. SEARS.

TYPE WRITING MACHINE.

(Application filed Nov. 9, 1898.)

(No Model.) 3 Sheets—Sheet 3.

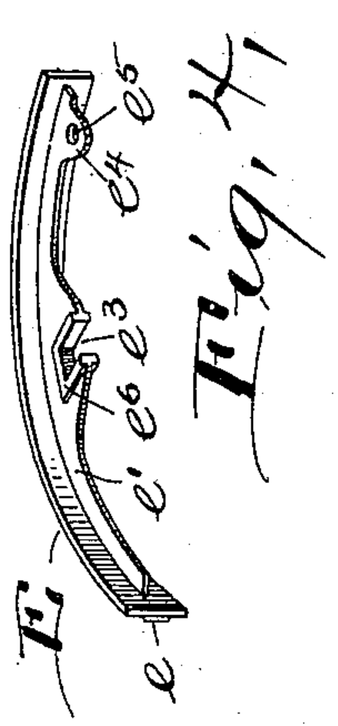

Fig. 4.

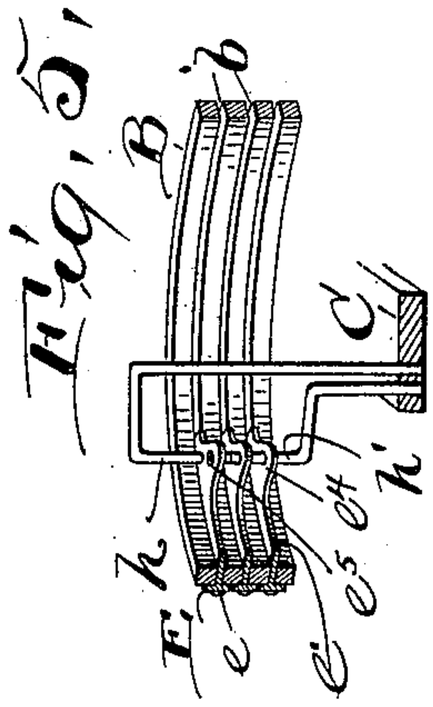

Fig. 5.

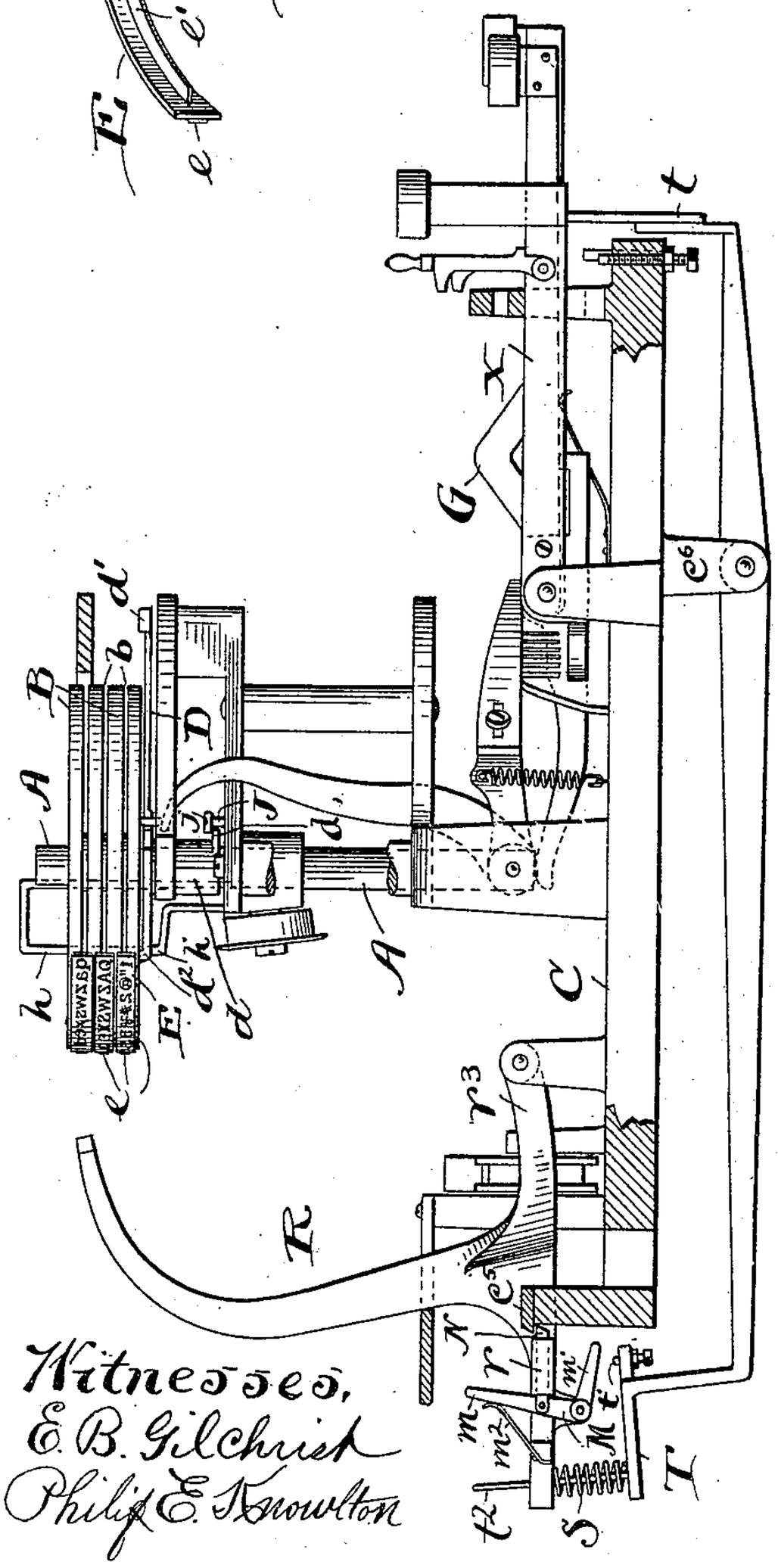

Fig. 3.

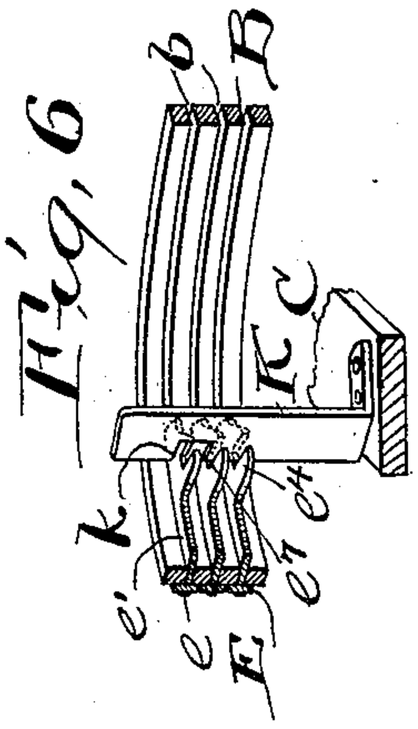

Fig. 6.

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UNITED STATES PATENT OFFICE.

CHARLES SEARS, OF CLEVELAND, OHIO.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 644,187, dated February 27, 1900.

Application filed November 9, 1898. Serial No. 695,945. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SEARS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Type-Writing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention relates to a class of type-writing machines of which the so-called "Hammond" machine is the best-known example now in the market.

One object is to reduce the inertia of the type-carrying device which must be moved in one direction or another to bring the proper letter to the printing-point, and this result is accomplished by reducing the size of the type-carrying shuttle which must be moved to bring a letter to the impression-point. Heretofore it has been customary to employ a single shuttle carrying all of the type arranged in a plurality of rows, generally three, and it has been necessary, therefore, to move this shuttle and all of the type carried thereby for every impression. My improvement with respect to this part of the machine consists in providing an independently-movable shuttle for each row of character type and in providing also mechanism for moving either shuttle at will and for preventing the movement of the other shuttles.

Another object of the invention is to provide novel mechanism whereby the hammer will deliver blows of uniform force, notwithstanding the fact that the type-writer carriage is fed forward at each stroke distances proportionate to the width of the corresponding character.

The invention is herein fully described, and definitely pointed out in the claims.

In the drawings, Figure 1 is a plan view of so much of a type-writer as enables one to fully understand the invention. Fig. 2 is a sectional side elevation of the same on line 2 2 of Fig. 1. Fig. 3 is a side view, partly in section, from the opposite side of the machine. Fig. 4 is a perspective view of one of the shuttles. Fig. 5 is a perspective view of a part of the anvil-cylinder, the shuttle, and the shuttle-locking device. Fig. 6 is a similar view showing a modified construction of the parts shown in Fig. 5.

A vertical shaft A, incapable of turning, is mounted in suitable bearings in which it may move vertically. The anvil-cylinder B is rigidly connected with this shaft. In this cylinder there are as many horizontal circumferential slots *b* as there are shuttles.

The shuttle-operator D is loosely mounted on the shaft A, resting on a part of the framework C of the machine, and it is prevented from moving upward by a horizontal flange *d*, which lies below the head *j* of a screw J.

One arm *d'* of the shuttle-operator (the stop-arm) extends forward to a point where it may engage with the vertically-movable stop-pins I, of which only one is shown in Fig. 2. There is, however, a stop-pin associated with each of the key-levers G, and each stop-pin is moved up by its associated lever, so that it may be engaged by the shuttle-operator stop-arm *d'*. This stop-pin is moved down by a spring *i*. These pins and their arrangement relative to the key-lever, whereby they are operated, is well known and therefore need not be here explained.

Another arm d^2 of the shuttle-operator extends rearward, is bent upward, and then rearward again, whereby its rear end may engage with that one of the shuttles which is in the impression-line, this being the upper shuttle when the shaft A is in its lower position, which is the normal position of said shaft. Any mechanism may be used intermediate of the shuttle-operator and the keys, whereby each key-lever imparts to the shuttle-operator a distinctive movement either with respect to direction or distance. The mechanism shown for this purpose is substantially the mechanism which is employed in the commercial Hammond machine and need not be here explained.

The mechanism shown for raising the shaft, so as to bring either of the shuttles into the impression-line and so as to be engaged by the shuttle-operator, is substantially the mechanism employed for this purpose in the commercial Hammond machine. It consists of an arm *w*, which projects rearwardly from

a pivoted bar W and engages with the lower end of the shaft A. The shift key-levers X are connected with this bar, whereby the depression of either lever causes the bar to rock upon its pivot a greater or less distance, whereby the shaft A is raised a greater or less distance.

Each shuttle is a thin segment E, having on its outer convex side a single horizontal row of characters *e*. To its inner concave side a thin horizontal fin *e'* is secured. This fin lies in one of the slots *b* of the anvil-cylinder, whereby it is guided and the shuttle held in line. At two or more points this fin is extended entirely through the anvil-cylinder, and to one or both these of extensions some device—as, for example, a strengthening-flange e^6, as shown in Fig. 4—is secured inside the anvil-cylinder, whereby the shuttle is held in proper relation to said cylinder, although it is permitted to move in the arc of a circle around said cylinder. In one of these extensions e^2, which is preferably at the middle of the shuttle, there is a notch e^3, which is adapted to receive the end of the arm *d* of the shuttle-operator. Another extension e^4 has a hole e^5, (or it may be merely a notch, as shown in Fig. 6,) which is adapted to receive a shuttle-locking device. This shuttle-locking device may be in the form of two pins *h* *h'*, which are attached to the frame C and are in the same vertical plane, one above the other, there being between their ends a sufficient space for the free movement of one of these extensions on the shuttle-fin. The form of this locking device may be materially changed without in any way changing its essential characteristics or mode of operation. For example, it may be a thin flat bar K, secured in a vertical position to the frame C, which bar is adapted to enter notches e^7 in the extension e^4. This bar has itself a notch *k* in its edge wide and deep enough for one of these extensions to pass through it. This construction is shown in Fig. 6. The notch in this bar, or in the other construction the space between the ends of the pins, is in the same horizontal plane with the end of the shuttle-operator arm d^2. The function of this locking device is to prevent the rotation of any shuttle, except that which this operating-arm is in engagement with. It will be clearly seen that when the shaft A is raised, carrying with it the anvil-cylinder and shuttles, the extensions e^4 on all of the shuttles, except that in the impression-line, are engaged by this locking device.

There are several advantages in employing these independent shuttles, each carrying only one row of type. One advantage is the reduction in weight of the thing necessarily moved to bring the proper letter to the impression-point and the consequent reduction in the inertia of that thing. Another advantage is that when one of the shuttles is broken or worn out it alone need be replaced by another. The shuttle carrying the lower-case characters is subjected to very much more wear than either of the other shuttles, and it will therefore wear out very much sooner.

There is, moreover, a distinct and valuable improvement in the construction of the shuttles, as shown. Heretofore the shuttles have been made of hard rubber in the segment form, with the characters upon the outer face, and a metal guide-fin has been set into the concave side of this rubber plate. Obviously this construction is expensive and is not durable. The shuttles which I prefer to use and which are shown in the drawings are formed by first making an electrotype of the characters desired in the line, then filling this electrotype with and securing it to a thin malleable metal backing. The flat plate thus formed is then bent into the desired segment shape and the metal fin is soldered or otherwise secured to its concave side. This is a very much cheaper construction than that referred to which has been heretofore used and it is believed it will last longer.

In type-writing machines it is desirable that all characters shall be printed by blows of uniform force, and the machine, as shown, embodies novel mechanism for effecting this result.

The impression-hammer R is pivoted to the frame C by forwardly-extending arms r^3, whereby the weight of the hammer draws it backward. It is latched in this retracted position by a sliding spring-latch N, which engages with a rib c^5 on the frame. This latch is mounted on a rearwardly-extended arm *r* of the hammer. Its rear end is connected with an arm *m* of a bell-crank lever M, which is pivoted to this arm *r*. m^2 is a spring acting directly on this arm of the bell-crank lever to move it and the latch, to which it is connected, in the latching direction. The end of the latch and of the rib c^5 are beveled, whereby the latching is automatic. The other and nearly horizontal arm *m'* of the bell-crank lever lies over the end of an adjustable screw *t'*, carried by a lever T. This lever in the form shown passes under the frame, being pivoted to ears c^6. Secured to the front end of this lever is a bar *t*, which lies beneath all of the key-levers. These key-levers are pivoted to the frame in such manner that their forward ends move different distances in making a complete stroke. The top of the bar *t* is therefore notched directly beneath the several key-levers in such a manner that the unequal movements of the key-levers cause uniform movements of this bar and the lever T, to which it is attached. On the rear end of this lever a rod t^2 is secured which passes up through a slot in the rearwardly-extending hammer-arm *r*. Between the hammer-arm and the lever and surrounding this rod is a coiled spring S. When by the depression of any key-lever this lever T is rocked the spring S is put under tension, which is

the same in all cases, and then the screw-point *t'* strikes the horizontal arm *m'* of the bell-crank lever M and rocks it, whereupon the latch is withdrawn and the hammer is swung forward by the expansion of the spring. Having struck its blow, the hammer falls back with sufficient force to cause the latch to again engage with the frame-rib.

Having described my invention, I claim—

1. In a type-writing machine, the combination of an anvil having a plurality of parallel slots, and a plurality of type-shuttles each having on its inner face a fin which lies and moves in one of said slots, and each fin having two extensions which pass through the anvil, with mechanism for moving the anvil to bring any shuttle into the impression-line, a shuttle-operator adapted to engage with one of the rearward extensions on the fin of that shuttle which is in the impression-line, and a shuttle-locking device fixed to the frame of the machine and engaging with the other extensions on the fins of the other shuttles, substantially as specified.

2. In a type-writing machine, the combination of an anvil-cylinder having a plurality of parallel slots, and a plurality of segment-shaped type-shuttles each having on its inner face a fin which lies and operates in one of said slots, each fin having one extension through the anvil which extension is vertically notched, and having also another extension through said anvil, mechanism for moving said anvil to bring either shuttle into the impression-line, a concentrically-mounted shuttle-operator having an outer horizontal end which is adapted to engage in the notched extension of that shuttle which is in the impression-line, mechanism for moving said operator, and a shuttle-locking device fixed to the frame and engaging with the other extensions on the fins of the other shuttles, substantially as specified.

3. In a type-writing machine, the combination of an anvil-cylinder having a plurality of circumferential slots, a plurality of segment-shaped type-shuttles, each having on its concave side a fin which lies and operates in one of said slots, each fin having two extensions which pass entirely through said slots, with mechanism for moving the anvil-cylinder to bring any shuttle into the impression-line, a shuttle-operator adapted to engage with one inward extension of the fin on the shuttle in the impression-line, and a shuttle-locking device fixed to the frame of the machine and engaging with the other extensions on the fins of the other shuttles, substantially as and for the purpose specified.

4. In a type-writing machine, the combination of the impression-hammer having a rearwardly-extended arm, a spring-latch mounted on said arm and adapted to engage with the machine-frame, and a bell-crank lever mounted on said arm, one arm of which engages with the latch, with a lever carrying a vertical rod which passes up through a slot in the hammer-arm, a coiled spring surrounding said rod and lying between the lever and hammer-arm, and an adjustable tripping device for engaging with the free arm of the bell-crank lever and the lever first named whereby the latter is operated, and mechanism whereby the said lever is operated by the key-levers, substantially as and for the purpose specified.

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

CHARLES SEARS.

Witnesses:
THOS. C. BRINKLEY,
PHILIP E. KNOWLTON.