

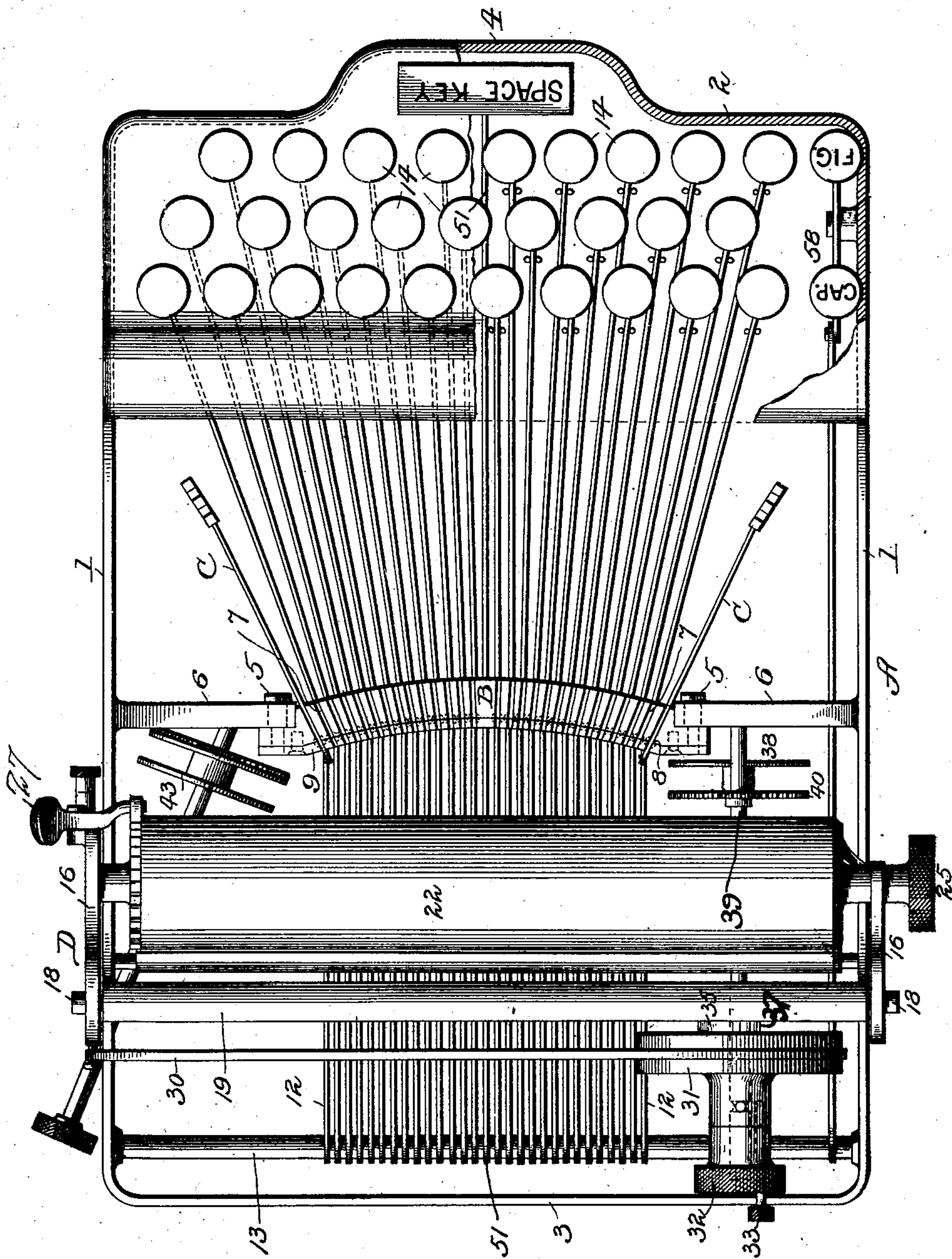
No. 721,102.

PATENTED FEB. 17, 1903.

J. A. SMITH.  
TYPE WRITING MACHINE.  
APPLICATION FILED MAR. 9, 1899.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses  
John Anders Jr.  
Asaph H. Varfield

Fig. 1.

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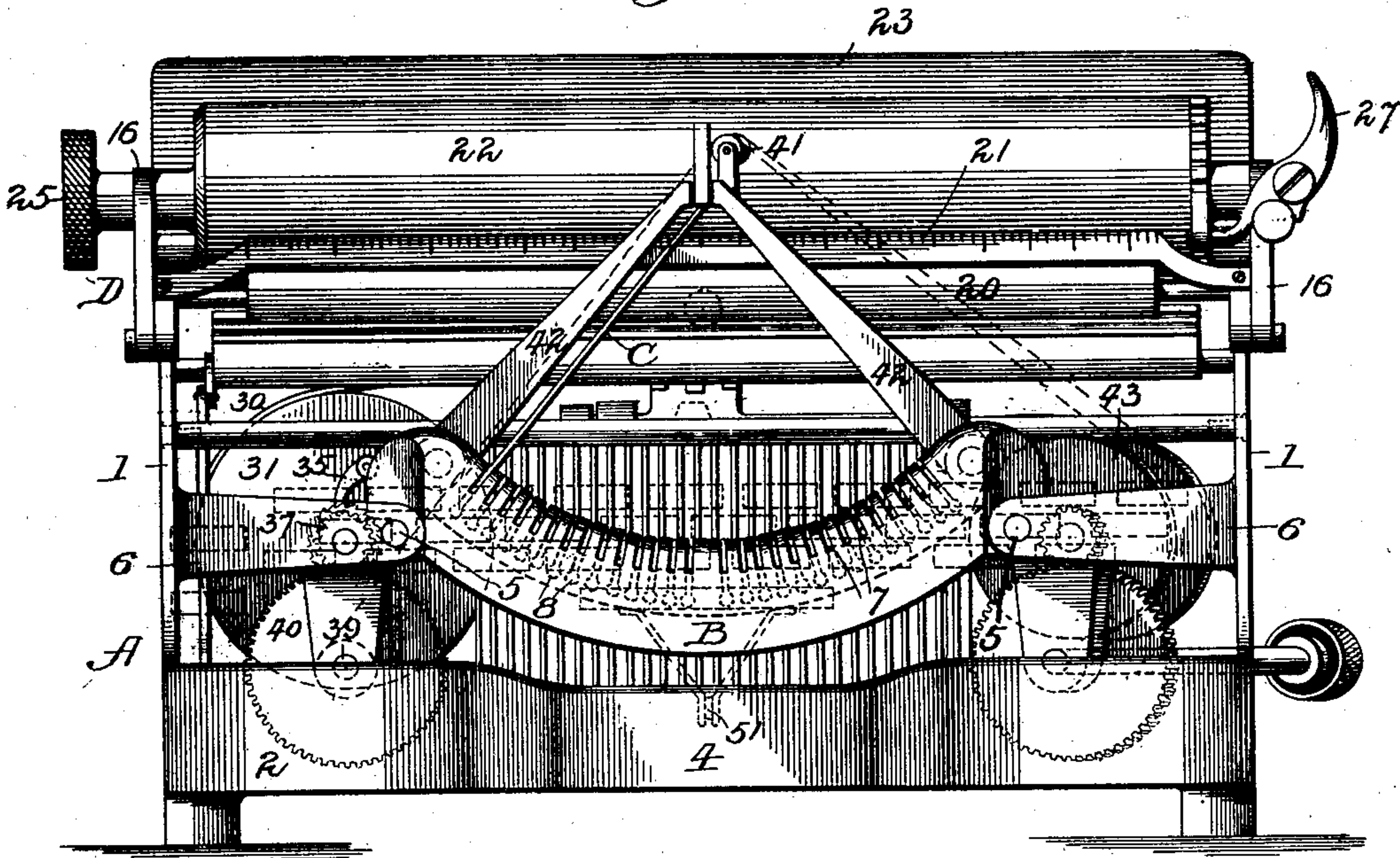
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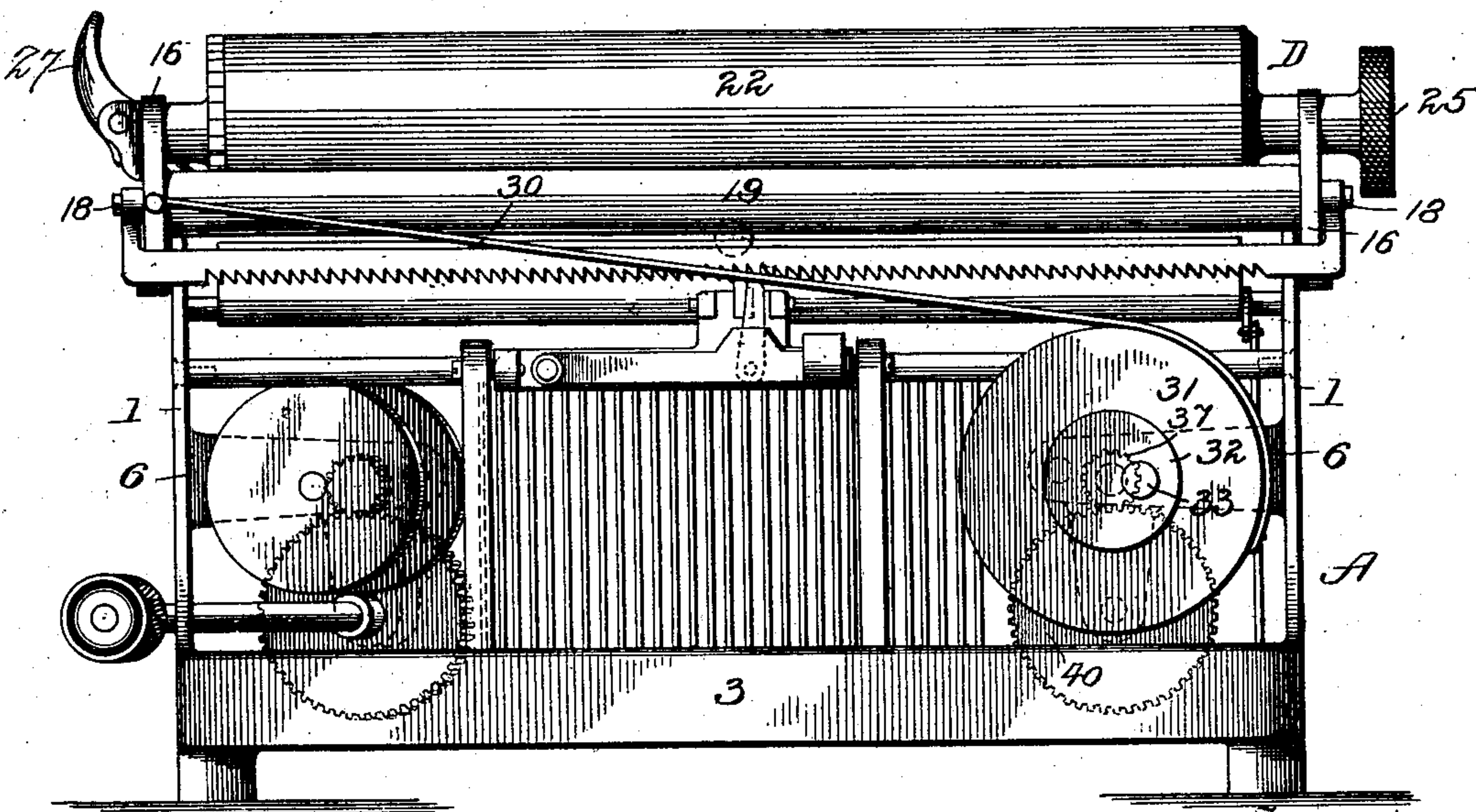
NO MODEL.

3 SHEETS—SHEET 2.

*Fig. 2.*



*Fig. 3.*



Witnesses  
John Enders, jr.  
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Inventor  
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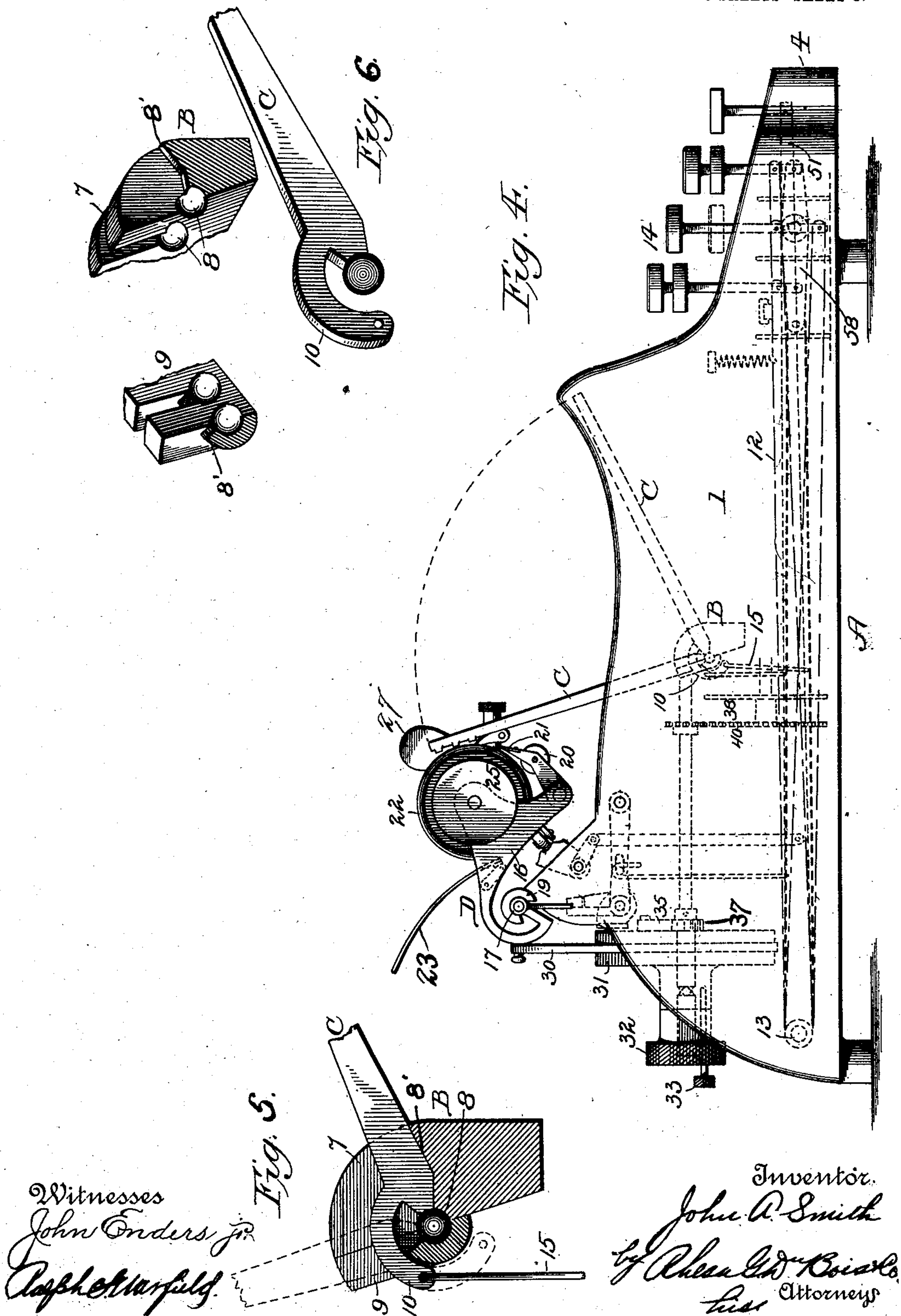
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3 SHEETS—SHEET 3.





# UNITED STATES PATENT OFFICE.

JOHN ALF. SMITH, OF BLACK ROCK, CONNECTICUT.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 721,102, dated February 17, 1903.

Application filed March 9, 1899. Serial No. 708,434. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN ALFRED SMITH, a citizen of the United States, residing at Black Rock, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to an improvement in type-writing machines, a primary object being to provide a light machine which can be cheaply constructed and placed on the market at a price much less than that of other machines; and at the same time my object is to furnish a durable machine and one which is easy to operate.

A further object is to furnish a machine capable of a high rate of speed.

Another object is to so construct the machine that it has great manifolding power.

Still further objects are to attain a machine which will withstand the hard punishment to which mechanism of this character is subjected without impairment of its action or causing the slightest inaccuracy in alinement.

It is an object of my invention also to provide a light and compact machine of comparatively few parts to construct originally or to get out of order, one in which the writing is always visible the moment after a letter is formed, and one in which more than the usual number of characters can be printed with a minimum number of keys and type-bars.

Further objects are to so construct a machine that the movements of the various parts will be easy, quick, and responsive, with the least possible amount of friction; and still further I have in view the idea of a construction which can be repaired with comparative ease when necessary and at the same time one which is not likely to get out of repair easily.

With the foregoing objects in view my invention consists in certain novel features of construction and combinations of parts, which will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of the machine. Fig. 2 is a view in front elevation. Fig. 3 is a view in rear elevation. Fig. 4 is a view in side elevation.

Fig. 5 is an enlarged sectional view showing the type-bar bearings, and Fig. 6 is a view of a type-bar and its sockets and caps dismembered.

A represents the frame of the machine. This frame is rectangular in plan or horizontal section, and it preferably has the plain imperforate sides 1 1, which project upwardly a suitable distance, as shown in Fig. 1, to afford a shield or guard for the bed of type-bars and other operating mechanism and to constitute a support for the carriage-rod. In front, as well as in the rear, it merely has narrow vertical plates 2 and 3, respectively, which connect the sides together at front and rear, and the front plate 2 is preferably bent outwardly at the center, as at 4, to afford clearance for and to furnish protection against injury to the spacing-key.

B indicates the type-bar bed or bearing. This bed or bearing is preferably curved in two directions or in the arcs of two circles, as indicated in Figs. 1 and 2, in consequence of its position below and forward of the paper-roller to insure a proper centering of the type. The bed is secured at its ends by means of screws 5 5 to the inwardly-projecting arms 6 6, extending from the opposite sides 1 1 of the frame of the machine. The type-bar bearing or bed has a number of guides 7 7 formed therein for guiding the type-bars in their movement throughout their entire length of travel, and these guides also radiate from two centers, one from above the bearing or bed and the other rearward of it, from which the two arcs of the type-bar bearing or bed are struck. The object of the double curve is to prevent collision of the type-bars, for by means of this double curve the bars are caused to gradually spread apart on their way from the printing-point to their resting-place. Sockets 8 8 are formed at the inner edge of these several guides, and a type-bar bearing cap or plate 9, having corresponding grooves and sockets to those in the type-bar bearing or bed and forming complements thereof, is screwed or otherwise secured removably to the forward edge of the type-bar bearing or bed for retaining the type-bars in place therein. Seats 8' 8' are formed at the bottoms of the grooves between the guides 7 7 in both the bed and the cap-



plate, in which seats the type-bars are adapted to rest in either of their extreme positions respectively, the seats in the cap-plate forming stops to limit the forward movement of the type-bars.

C C represent the type-bars. These bars are twenty-eight in number, and they are made of spring-steel, preferably four one-hundredths of an inch thick. On the inner end of each bar a ball about nine sixty-fourths of an inch in diameter is formed, said balls fitting in the sockets in the type-bar bearing or bed, in which they are adapted to operate, the ball formation resulting in the least possible amount of friction and also assisting in maintaining the desired accuracy of alinement. The type-bars each carry three hardened-steel type at the outer end for accomplishing the printing. The lower ends of the type-bars are each provided with a projecting segment which extends forward a short distance beyond the ball-bearing. Type-operating levers 12 12 are pivoted in the usual manner on a common support 13 at the extreme rear of the machine, the levers extending forward to the extreme front of the type-writer, as shown in Figs. 1 and 4, within convenient reach of the operator, and each one is provided in the accustomed manner with the keys 14 14. Links 15 15 extend from the ends of the segments 10 to the levers, and through them the motion of the keys and type-operating levers is communicated to the type-bar. Suitable springs or equivalent means (not shown) will of course be provided for returning the keys to their normally elevated positions.

From the foregoing it will be seen that a very slight movement of the keys imparts a powerful leverage to the type-bars, and hence a great advantage, heretofore alluded to in the objects, of great manifolding power. It will also be observed that in consequence of the construction of the several parts described and the formation of the individual type-bars the movement of the several parts is exceedingly rapid. Furthermore, it will be noticed that the shape of the type-bars, owing to their thinness, as shown in Fig. 4, and to the fact that their pivotal support in the bed B, which, as previously stated, is located below and forward of the roller and is curved in two directions, is such that two types can come within a half-inch of the paper without touching each other.

D is the carriage. It conveniently consists of the end plates 16 16 and the rod 17, to which these end plates are secured in any approved manner—as, for instance, by means of pins 18 18, inserted through holes bored in the end plates and the ends of the rods, respectively. Across the frame A is fastened a tube-like bearing 19, preferably of malleable iron, the same being cored out in places, leaving, say, nine one-sixteenth-inch bearings, upon which the rod 17 runs in the movement of the carriage back and forth on the ma-

chine. The carriage has connected with it a paper-feed roll 20 and a printing-scale 21, beneath which and between which and the main roller 22 the paper is fed. It also has the usual paper-shield 23 immediately in rear of the main roller. A knob 25 on one end, generally the left-hand end, of the main roller is furnished to afford ready means of turning the roller back and forth when required, and at the other end of this roller is provided any convenient line-spacing mechanism. The line-spacing mechanism is provided with a thumb-lever 27, which is also used for shifting the carriage. The carriage is under constant tension in one direction, somewhat after the usual manner, through the strap 30, extending from the right-hand end of the carriage across to the mainspring-barrel 31 on the opposite side of the machine, and the tension of this spring is regulated by the knob 32, and this knob is secured to the barrel by means of the sliding lock-pin 33. To the barrel is pivoted a pawl 35, and this operates in connection with a gear-wheel 37, which operates the ribbon-reel 38 on the gear-shaft 39, through a gear-wheel 40 on the shaft 39, the ribbon being carried upward over a roller 41 and the type-guides 42 and thence to the return ribbon-reel 43 on the other side of the machine, and the latter reel is provided with a knob for turning it. The carriage is also provided with a suitable spacing mechanism, so that with each downward movement of a type-operating lever the carriage is moved one space.

A space-bar 51 is secured on an independent lever located centrally on the machine and to all intents and purposes the same as the type-operating levers.

Various other slight alterations will be readily recognized as possible with the development of this style of machine, and hence I do not wish to be limited to the exact construction herein described.

The operation has been alluded to in various parts of the description and need hardly be here repeated; but to summarize briefly it may be said that the paper is put in the machine in the usual way. The ribbon is also reeled in the accustomed manner, and the keys are manipulated the same way. The shifting of the carriage is all accomplished through the shift-key 58, and the step-by-step movement of the carriage in one direction is accomplished by the movement of the several key-operating levers or the spacing-lever, and the carriage may be returned by simply pushing it bodily backward in the accustomed manner of nearly every type-writer now in use.

It will be seen from the foregoing that the printing is visible, the action of the type-bars is rapid, the leverage powerful, affording great manifolding power, the parts are few and simple, and the entire machine is light and portable. The accuracy of alinement is completely provided for, as the type-bars are guided throughout their entire movement



and finally at the type end by the type-guide. The type are arranged where they can be easily and quickly cleaned, and, furthermore, the shape of the type-writer frame is such that they are guarded and protected from the sides. In short, the construction is most effectual in the accomplishment of the object sought, and at the same time the machine is one which can be put into the hands of the consumer at a comparatively small price.

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

1. In a type-writing machine, a frame consisting of narrow front and rear strips of metal, and closed side plates affording support to the operating mechanism of the machine, said side plates projecting sufficiently high above the type to afford a lateral shield or guard for the type-bars and type.

2. In a type-writing machine, the combination with the frame, and a carriage, of a type-bar bearing or bed and cap therefor, said bed and cap having spherical sockets formed therebetween, grooves in the bed and cap and type-bars having ball-bearings fitted to and adapted to swing in said sockets and means for operating said type-bars.

3. In a type-writing machine, the combination with a frame, a carriage and a main roller carried thereby, of a type-bar bearing or bed, said bearing or bed provided with radiating grooves, a cap removably secured to the bearing or bed, the cap and bearing or bed having spherical sockets formed therebetween and type-bars having ball-bearings fitted to said sockets and adapted to turn therein and be guided throughout their movements, by the radial grooves.

4. In a type-writing machine, the combination with a frame and a carriage supported thereon and carrying a main roller, of a type-bar bearing or bed having radial grooves therein and spherical sockets in said grooves, type-bars having ball-bearings thereon fitted in said sockets, said type-bars terminating in segments which extend beyond the bearings, links pivotally connected with the segments and type-operating levers to which the links are pivotally connected.

5. In a type-writing machine, the combination with a frame, a carriage, and a platen carried thereby, of a type-bar bed, the bed provided with arc-shaped radiating grooves, a cap removably secured to the bed, the cap and bed having registering sockets formed therein partly in the cap and partly in the bed, type-bars having enlarged bearings secured to the inner ends thereof, the bearings received, fitting and retained within the sockets, and adapted to turn therein, the type-bars guided throughout their movements by the radial grooves.

6. In a type-writing machine, the combination with a frame, a carriage supported upon the frame and a platen carried by the carriage, of a type-bar bed, the bed provided with arc-shaped radiating grooves, a cap removably secured to the bed, the cap and bed having registering recesses formed therein which when the bed and cap are placed together, form sockets, communicating with the radial grooves which are also formed in the cap, type-bars provided with bearings secured to the inner ends thereof, the bearings received in the sockets, the type-bars adapted to be guided throughout the radius of their movement by the radial grooves.

7. In a type-writing machine, the combination with a frame, of a type-bed, the bed provided with arc-shaped radial grooves, a cap removably secured to the bed, the cap provided with grooves registering with the grooves in the type-bed, the cap and bed having registering recesses formed therein, forming sockets communicating with the radial grooves in the bed and cap, seats formed in the grooves in the bed and cap, the seat in the type-bed being larger than the seat in the cap, type-bars provided with bearings secured to their inner ends, the bearings received in the sockets and adapted to turn therein, the bars moving in and guided by the radial grooves, the type-bars adapted to normally rest in the seats in the bed, the forward movement thereof being limited by the seat or stop in the cap.

JOHN ALF. SMITH.

In presence of—

K. H. PETERSON,  
FRED W. TRACY.