

(No Model.)

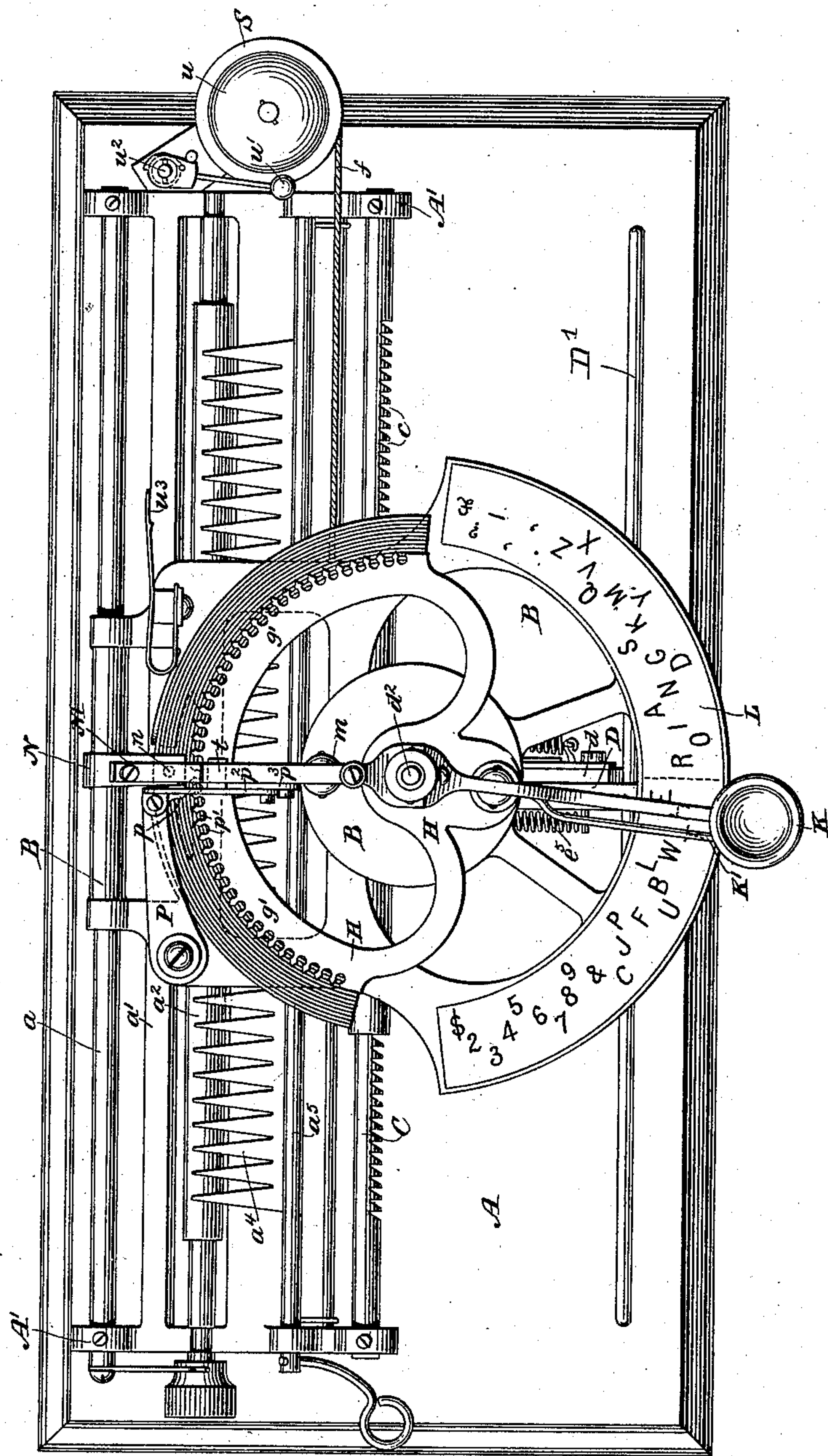
3 Sheets—Sheet 1.

J. H. DAY & C. SPOFFORD.
TYPE WRITING MACHINE.

No. 406,507.

Patented July 9, 1889.

Fig. 1.



Witnesses

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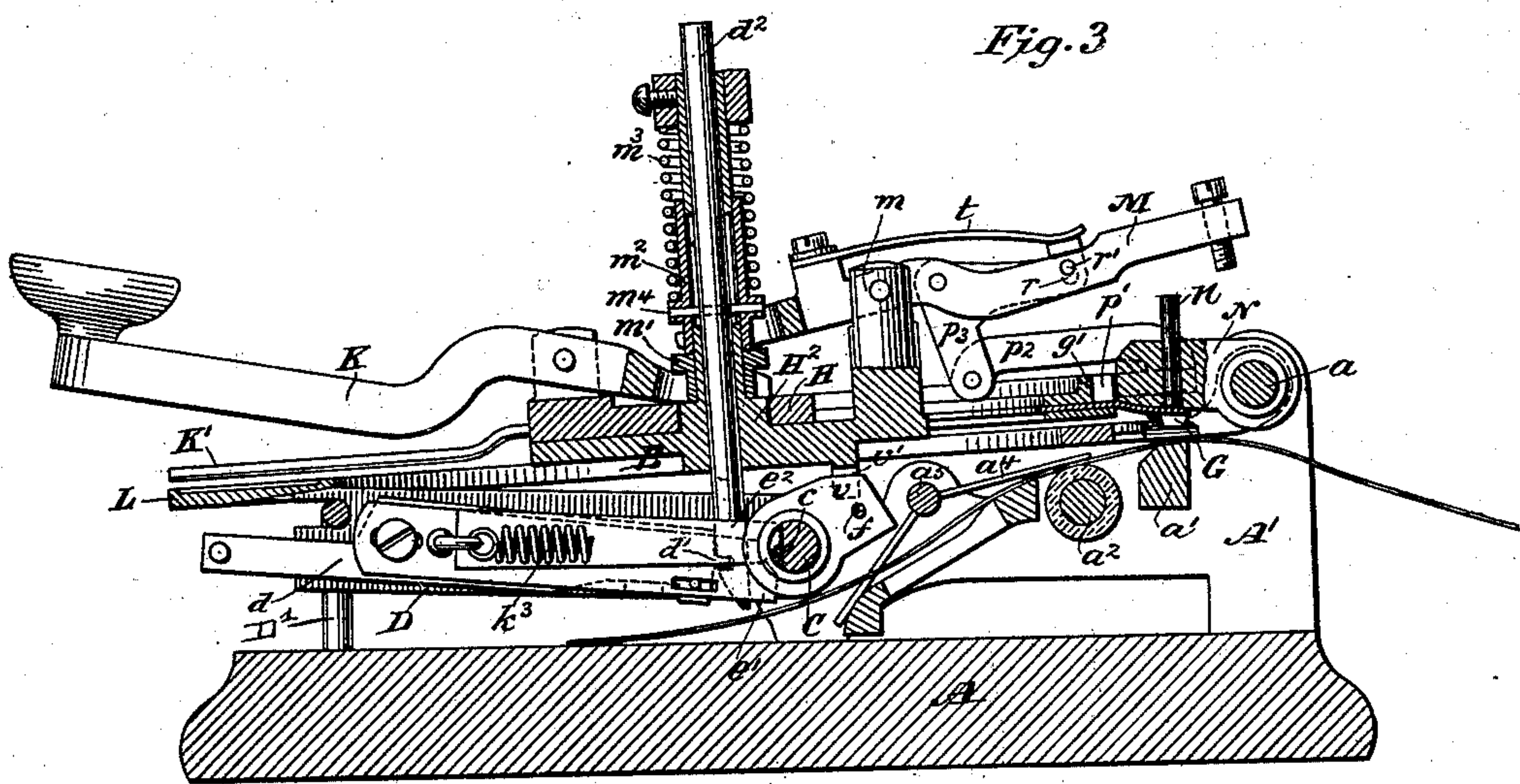
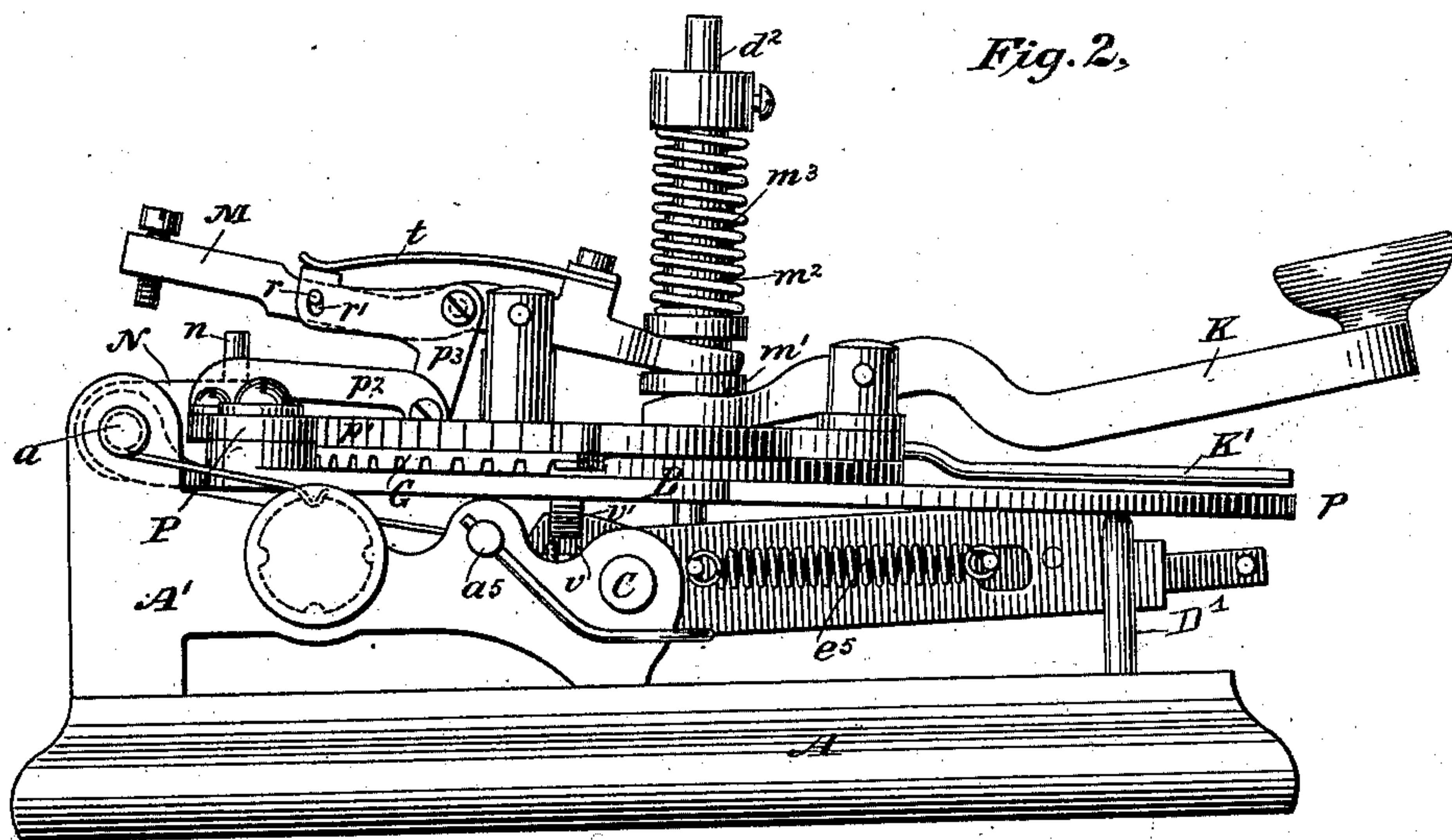
(No Model.)

3 Sheets—Sheet 2.

J. H. DAY & C. SPOFFORD.
TYPE WRITING MACHINE.

No. 406,507.

Patented July 9, 1889.



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3 Sheets—Sheet 3.

J. H. DAY & C. SPOFFORD.
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Fig. 4.

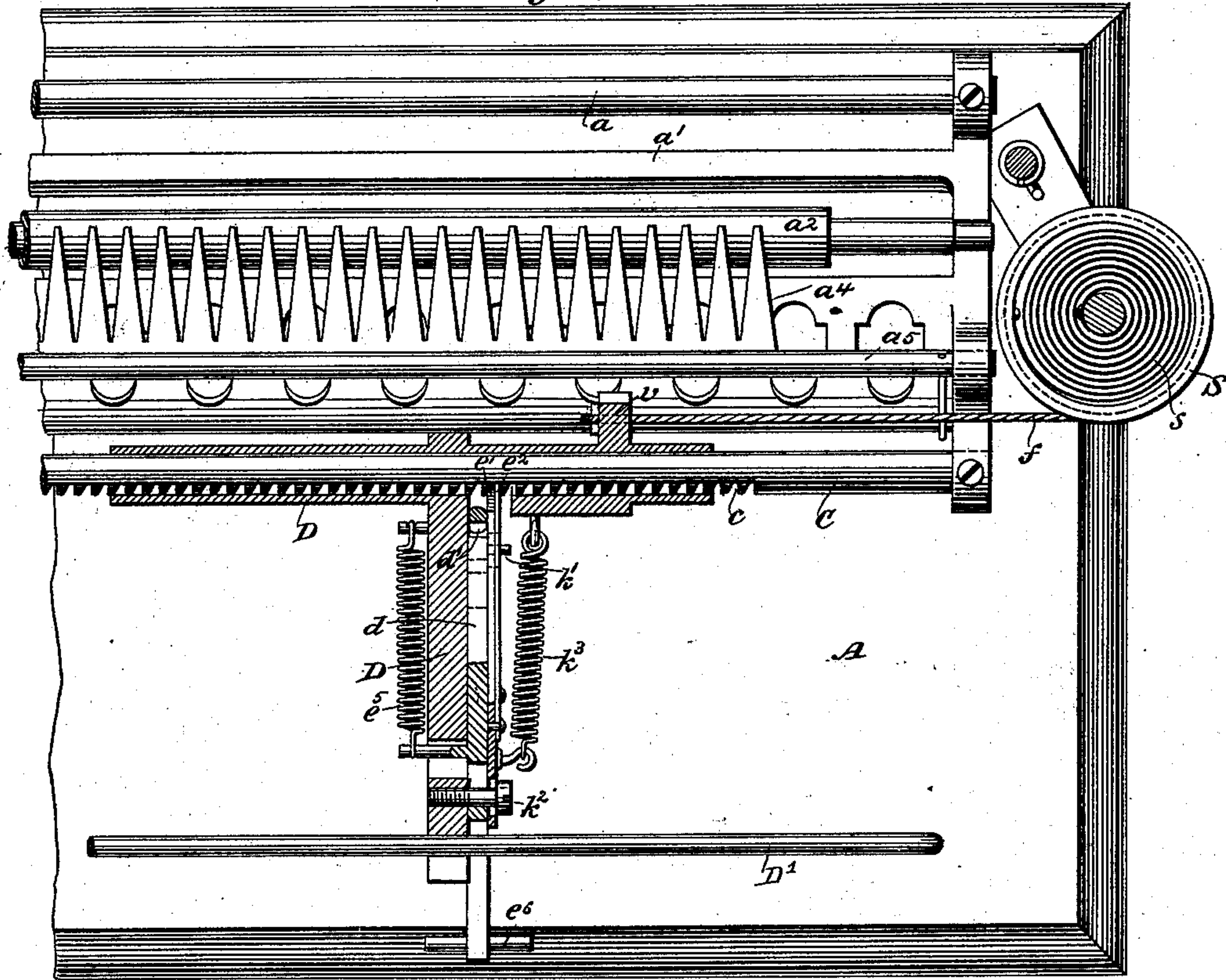


Fig. 5.

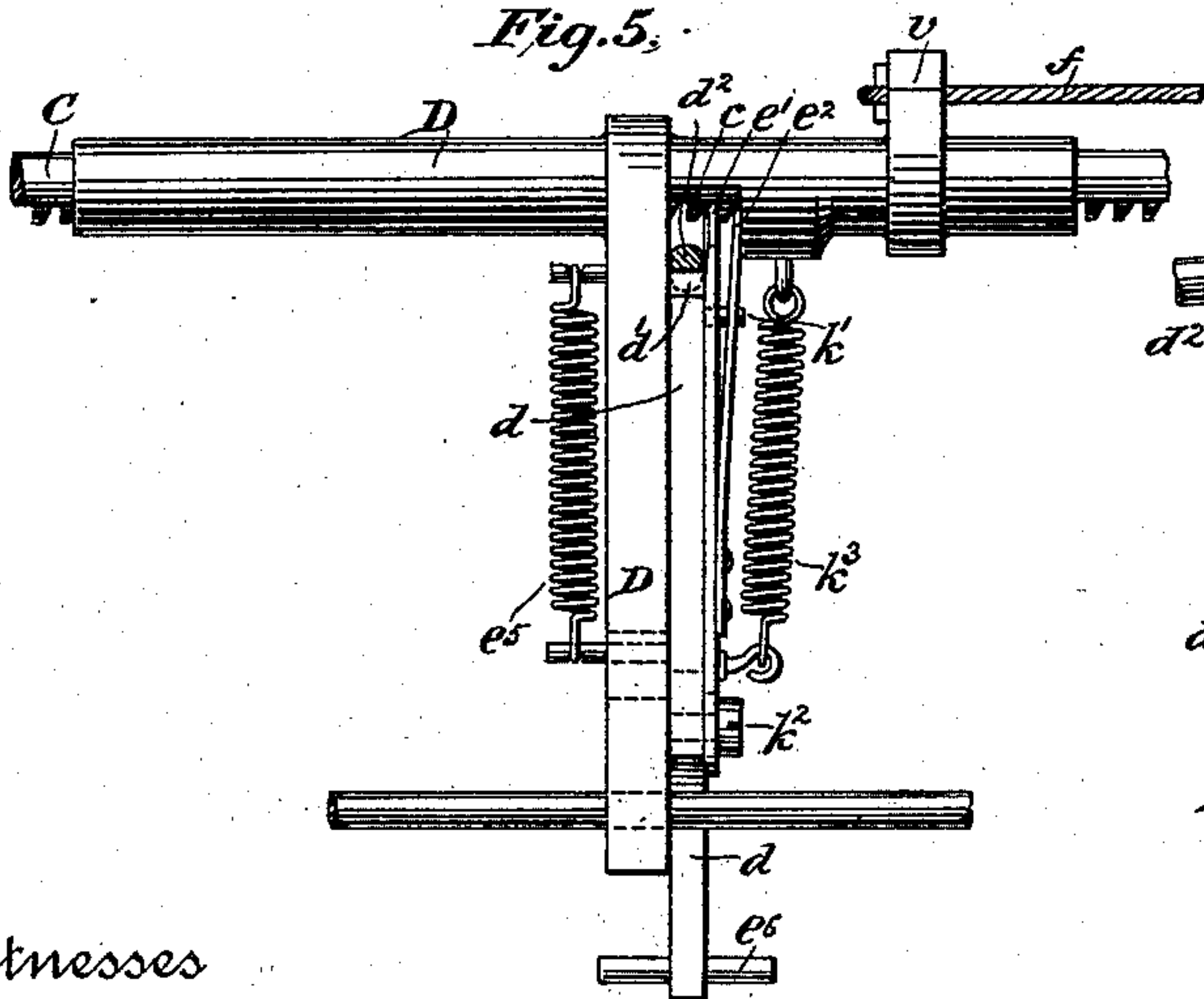
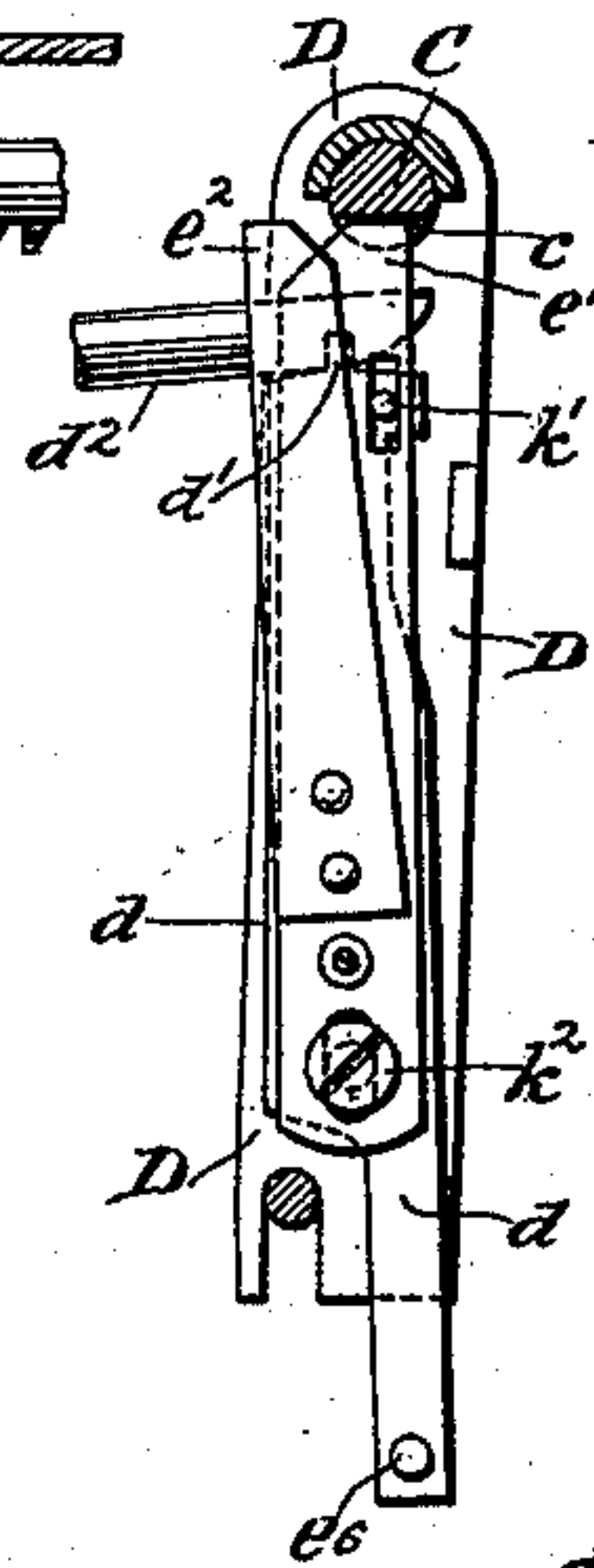


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

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ASSIGNORS TO JOHN H. DAY AND GEORGE LESTER, BOTH OF RICHMOND
HILL, NEW YORK.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 406,507, dated July 9, 1889.

Application filed April 6, 1887. Serial No. 233,831. (No model.)

To all whom it may concern:

Be it known that we, JOHN H. DAY and CHARLES SPOFFORD, citizens of the United States, residing, respectively, in New York, in the county and State of New York, and in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

The invention relates to the class of instruments known as "type-writers."

The object of the invention is to provide a simple and efficient form of type-writing machine which may be manufactured at a small cost and will be capable of printing characters accurately and neatly.

The invention relates more particularly to the class of instruments in which the type are carried upon a movable plate which is turned above the paper upon which the impressions are to be made until the proper character is in position, whereupon that character is thrust downward against the paper to give the impression; and the invention aims to simplify the construction of the machine and to increase its capacity and the accuracy of its operation.

The invention will be described in detail in connection with the accompanying drawings, in which—

Figure 1 is a plan view. Fig. 2 is an end view. Fig. 3 is a cross-section of the instrument; and Figs. 4, 5, and 6 are details showing particularly the spacing mechanism.

Referring to the figures, A represents the base-plate on which the instrument is supported. This plate carries a cast-iron or other suitable frame A', along which the type-support moves. The frame A' is constructed at its back portion with a longitudinal bar a , to which the carriage B is sleeved and along which it moves. Beneath and a little in front of the bar a is placed a printing-bar a' . A type-hammer, presently to be described, is at all times above this bar. In front of the bar a' is a paper-feeding roller a^2 , which serves to feed forward the paper after each line of impressions has been completed.

Above this roller there extends a comb or series of teeth a^4 , serving to hold the paper down against the roller. A rod a^5 , carrying the comb a^4 , is supported at its respective ends in the frame A', and a suitable arm or lever at its end serves to lift it from the roller when it is desired to adjust the paper without moving the roller.

In front of the roller and comb described there is placed a rack-bar C, for advancing the printing-carriage each time an impression is effected. This bar is provided with a series of teeth c , which are engaged by pawls e' and e^2 of a feeding device. This consists of a lever d , having a narrow extension d' at its end, which is engaged by a central pin or arm d^2 upon the carriage. This arm is thrust down and raised again each time an impression is effected, in a manner which will presently be described. The movement of the arm, and thus of the lever d , up and down carries a rigid pawl e' and a yielding or spring-pawl e^2 to and fro across the teeth of the ratchet, allowing one pawl to escape as the other enters. The spring-pawl tends to push forward, and as it escapes from one tooth it passes into the plane of the next tooth, so that upon the next downward movement it will engage that tooth, while the pawl e' passes out of engagement with its tooth, thus allowing a step-by-step movement of the carriage. The pawls and the lever d are carried upon the frame D, moving upon the carriage-bar C. A bar D' supports the front of the frame D. As it is desirable that means be provided for permitting the type-carriage to be lifted from above the work, the plate d is movable longitudinally upon its support, but is normally held forward in position by the spring e^5 . A suitable handle e^6 serves to draw it forward and disengage it from the pin d^2 when it is desired to lift the carriage. The pin d^2 is preferably beveled upon its end, so that it will readily return to its normal position when the carriage is again turned down. The whole frame D is drawn to the right hand by reason of a spring s inclosed in a suitable drum S at the right-hand end of the machine. A cord f is wound upon the drum in such a

manner that the forcible moving of the carriage D toward the left hand will wind the spring sufficiently to cause the carriage to be drawn to the extreme right-hand end as the
 5 pawls are operated, giving it a step-by-step motion. For the purpose of readily returning the carriage to the left-hand end of the machine, the pawls e' and e^2 are preferably so mounted upon the plate d that they may be
 10 pushed forward as they are forced against the beveled surfaces of the teeth. For this reason they are coupled by pins or screws k' and k^2 , extending through suitable slots. A spring k^3 , however, normally holds the pawls forward
 15 against the teeth, one end of the spring being attached to the plate or pawl e' , while the other end is attached to the carriage D.

The printing mechanism itself will now be described. The type are carried upon a suitable flexible plate G, formed in the arc of a circle the center of which is concentric with the pin d^2 . This plate G is carried upon a movable frame H, pivoted to the central post H^2 , surrounding the pin d^2 , and through
 20 which the pin d^2 extends. A lever K, pivoted to the frame H, serves to turn the frame, and thus the type-plate, above the printing-bar a' , bringing any one of the type into position to print. For the purpose of determining the
 25 position of the type, an index-plate L is mounted upon the frame H carrying the printing mechanism. The lever K, or an index K' moving therewith above the index-plate, serves to show the position of the type-plate, so that the different type may be readily
 30 selected. When the proper type is brought above the paper as it passes over the printing-bar a' , that type is forced down against the paper by means of a printing point or
 40 pin n . This pin projects through a suitable arm N, carried upon the frame B, and preferably projecting from the portion which is pivoted to the carriage-bar a , and it terminates immediately above the printing-bar a' .
 45 It is necessary that this pin be forced downward when the plate is in position to print the required character. To accomplish this a lever M is employed. This lever is pivoted to the post m , carried upon the printing-carriage B, and having a forked extension surrounding the central post of the carriage. The lever K is also provided with a forked
 50 extension passing beneath the collar m' , engaging the sleeve m^2 , which receives the forked extension of the lever M. The spring m^3 normally forces this sleeve downward, and thus serves both to raise the lever M and also the lever K. When the lever K is pressed
 55 downward after it has been brought above the required type on the index-plate, the sleeve is pressed upward against the tension of this spring, causing the lever M also to be operated, thus forcing the printing-pin downward against the surface of the type-carrying
 60 plate and causing the impression to be effected. The pin d^2 is coupled with the sleeve by means of a pin m^4 , so that as the latter rises

and falls the pin d^2 will rise and fall, thus operating the pawl-carrying lever and escapement and allowing the carriage to advance. 70

For the purpose of insuring that the type shall be accurately in position to print when the pin n is forced downward, an adjuster P is employed. This consists of a lever carry-
 75 ing a wedge-shaped projection p , designed to pass into corresponding openings or teeth p' upon the edge of the plate g' . This wedge is passed between the teeth and adjusts the plate before the pin n is operated. For this
 80 reason the lever M is allowed to move downward a slight distance before it engages the pin n , and during such movement the lever P is operated. This is accomplished by coupling the lever P with the lever M by a link p^2 ,
 85 one end of which is connected with the lever P, while the other is pivoted to the bell-crank lever p^3 , carried upon the lever M. This bell-crank lever is allowed slight movement relative to the lever M, by reason of a slot r and
 90 pin r' , extending therethrough from the lever M. It is desirable that the lever M be allowed a downward movement, even after the wedge p has entered to its full extent between the teeth. For this purpose a spring t presses
 95 downward against the end of the pivoted bell-crank lever p^3 , and while this spring will normally hold it downward, yet sufficient pressure upon the lever K will cause the lever M to move forward still farther without moving
 100 the adjuster P.

For the purpose of spacing between the words, the lever K may be moved downward a sufficient distance to operate the escapement mechanism without pressing the pin n
 105 against the type-plate; or some convenient point—for instance the central point in the plate L—may be left blank.

In order to give an alarm when the carriage is nearing the end of a line, an alarm
 110 device operated by the carriage may be employed. That here shown consists of a bell u , carried upon the support of the spring s and provided with a spring-hammer u' . This hammer is pivoted upon a suitable support
 115 u^2 , and a flexible arm u^3 , moving with the carriage H, engages the hammer and trips it one or more times, when the carriage is near the end of its excursion, toward the right hand. The end of the arm or spring u^3 will
 120 engage the tooth or projection upon the support of the hammer, and as the latter turns the spring will escape over the projection and thus release the hammer. A second stroke is obtained in like manner by the tooth or
 125 ratchet shown on the arm u^3 . The spring (indicated in dotted lines) surrounding the support u^2 tends to force the hammer u' at all times toward the bell, and therefore when the tooth or projection upon the support of the
 130 hammer escapes the end of the spring u^3 , or the teeth or ratchet shown thereon, then the hammer u' will immediately be impelled toward and strike the bell.

It will be evident that various modifications may be made in the details of the construction, and other forms of feeding devices may be substituted without departing from the spirit of the invention.

For the purpose of inking the type, two ink-pads are placed at either side of the pin n , so that as the type are moving to and fro they pass over and rub against these plates and receive the ink therefrom. To afford a stronger coupling between the carriage B and the carrier D, two arms v' pass upon the respective sides of the arm v , secured to and extending from the carrier D.

We claim as our invention—

1. In a type-writing machine, the combination, substantially as described, of a longitudinally-movable printing-carriage, a series of type carried thereby and movable independently thereof, a printing-lever for effecting impressions from the type, a lever for determining the position of the series of type with reference to the printing-lever, a sleeve or collar coupling the two levers, whereby the first-named lever may be operated by the second lever, and an escapement or feeding device and actuating mechanism therefor, substantially such as described, for advancing said carriage longitudinally after each impression.

2. The combination, in a type-writer, of an index-plate, a series of type, an index-finger for determining the position of the type through the instrumentality of the index-plate, a printing-lever, a pin engaged by the printing-lever for effecting impressions from the type, an escapement device, the vertically-movable pin d^2 , operating the escapement device, and a vertically-movable collar coupling said pin with the printing-lever.

3. The combination, in a type-writer, of a longitudinally-movable carriage, the type carried thereby and movable independently thereof, a printing-lever for effecting impressions from the type, an escapement device for the carriage governing its longitudinal movement, a detachable mechanical connection consisting, essentially, of the hook upon the central pin d^2 and the movable lever d , between the escapement device and the car-

riage, and a tension device for impelling the carriage in one direction, placed under stress by the forcible movement of the carriage in the opposite direction, substantially as described.

4. In a type-writer, the combination, with the movable carriage and the escapement-bar, of pawls engaging the teeth of said bar, and a yielding spring normally forcing the pawls toward and holding them in engagement with the bar, but permitting them to be moved at right angles to the length of the bar and then thrust out of engagement there-with upon the backward movement of the carriage, substantially as described.

5. In a type-writing instrument, the combination, with the movable carriage and the levers for effecting the impressions from the type, of an escapement device, a pin moving with the levers normally engaging the support of the escapement device, and means, substantially as described, for withdrawing the support from engagement with said pin.

6. In a type-writing instrument, the combination of the adjusting device consisting of the lever P, having the wedge-shaped extension, the toothed plate G, the lever M, for effecting impressions from the type, the bell-crank lever p^3 , with which the adjusting-lever is connected, and a yielding connection between said bell-crank lever and the lever M.

7. In a type-writing instrument, the combination of an index-plate, a type-carrying plate, a printing-lever, a lever for determining the position of the type, said lever moving in a horizontal direction, and also having a vertical movement in any of its horizontal positions, a mechanical connection between the printing-lever and the last-named lever, consisting of a sleeve or collar, and an adjusting-lever engaging the type-carrying plate.

In testimony whereof we have hereunto subscribed our names this 2d day of April, A. D. 1887.

JOHN H. DAY.
CHARLES SPOFFORD.

Witnesses:

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