

No. 667,433.

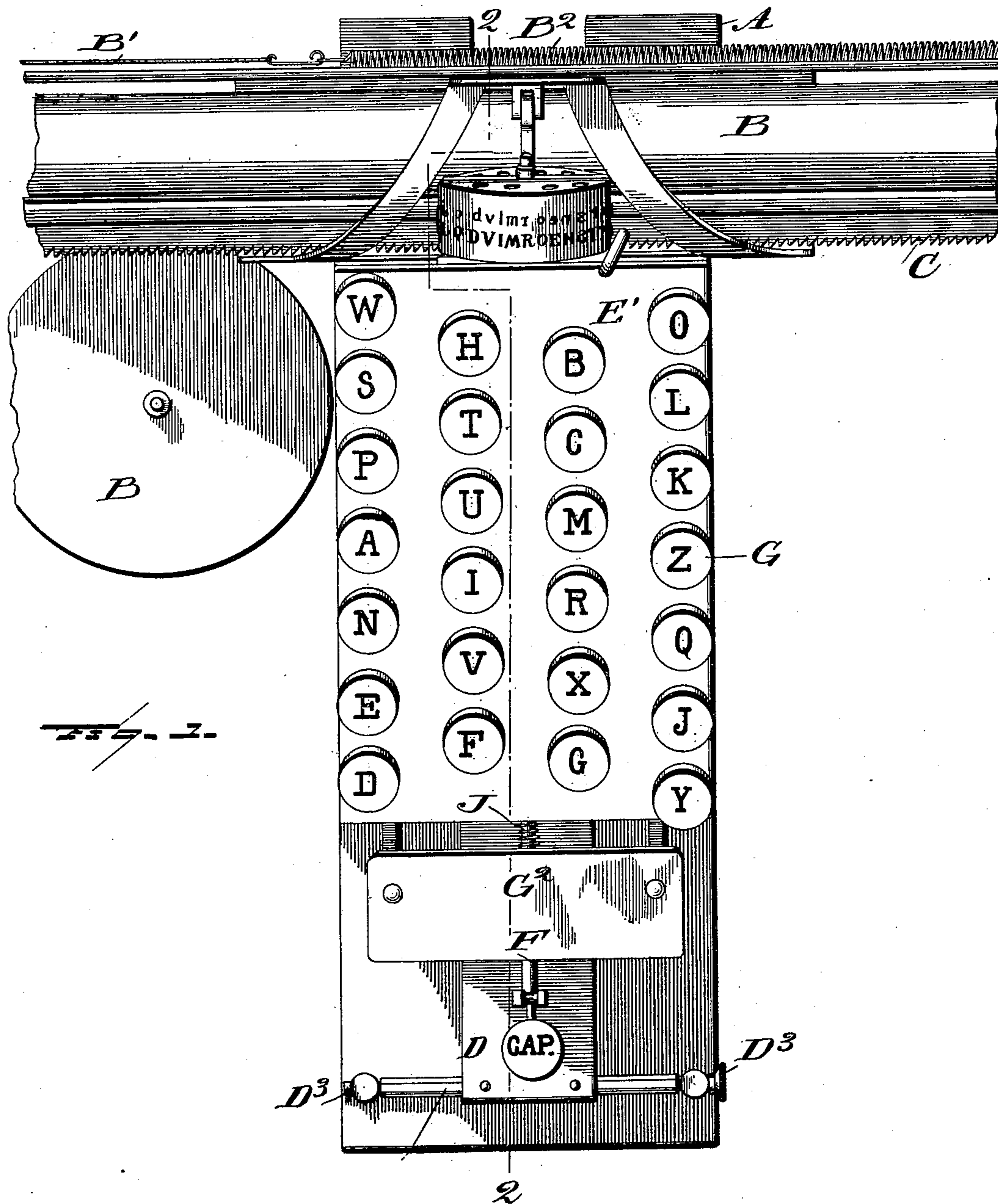
Patented Feb. 5, 1901.

A. C. FERGUSON.
TYPE WRITER.

(Application filed July 23, 1900.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES.

L. C. Mills.
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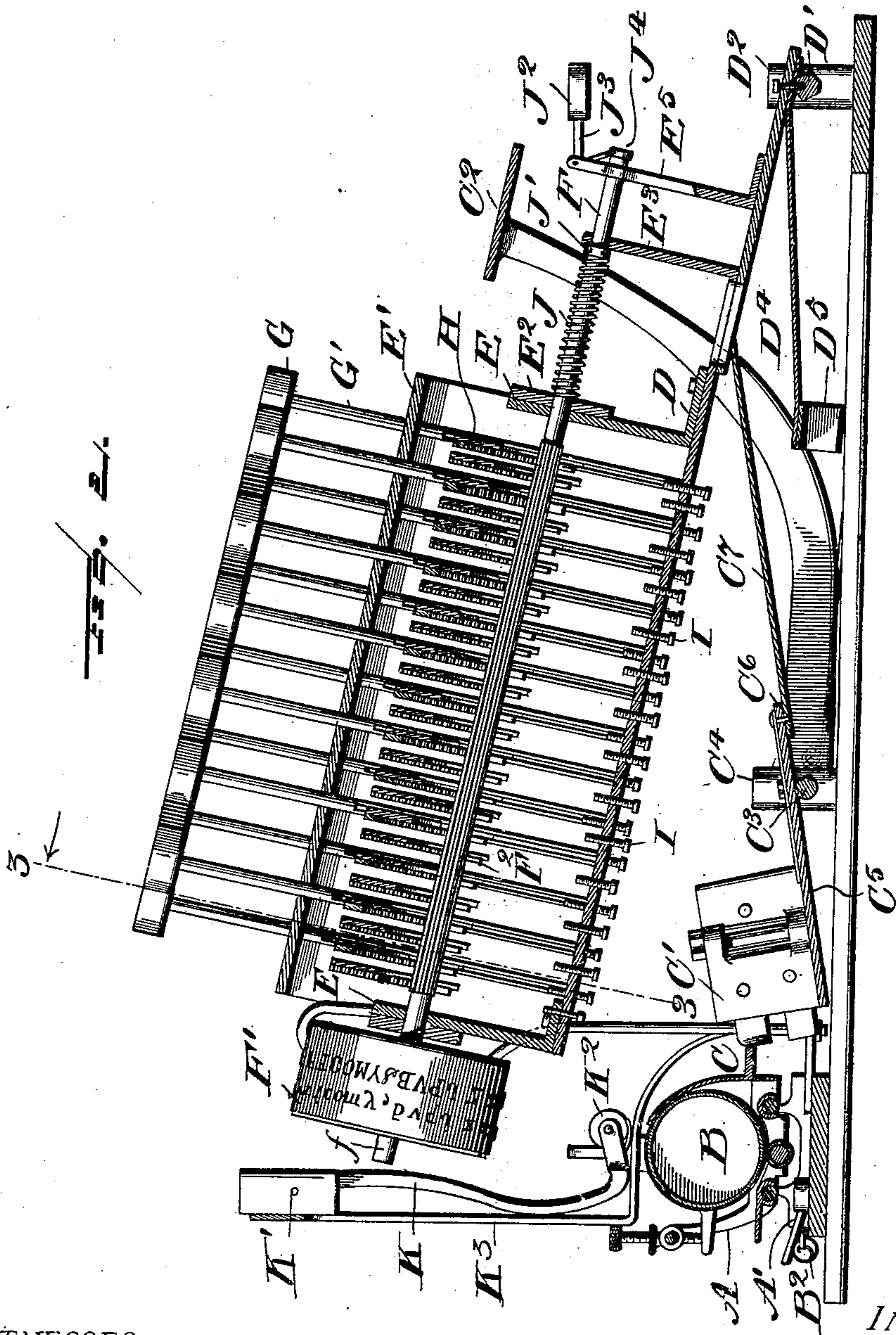
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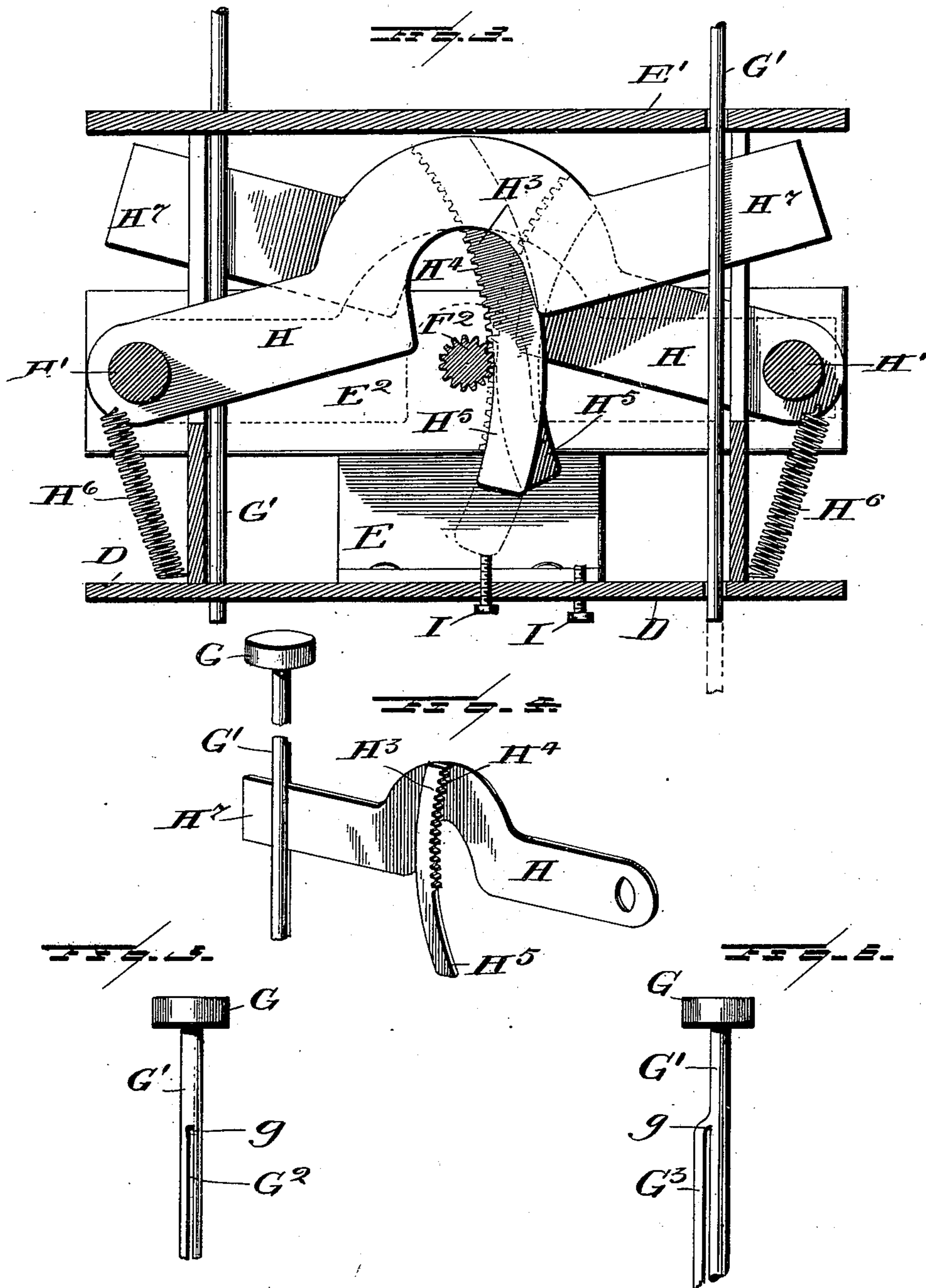
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UNITED STATES PATENT OFFICE.

ARTHUR C. FERGUSON, OF SARATOGA SPRINGS, NEW YORK.

TYPE-WRITER.

SPECIFICATION forming part of Letters Patent No. 667,433, dated February 5, 1901.

Application filed July 23, 1900. Serial No. 24,544. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR C. FERGUSON, a citizen of the United States, residing at Saratoga Springs, in the county of Saratoga, State of New York, have invented certain new and useful Improvements in Type-Writers, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to type-writers, and particularly to that class known as "type-wheel" type writing machines.

15 The invention has for one object to provide an improved mechanism for rotating to different degrees the type-wheel through the action of the type-key, whereby a simple, direct, and efficiently-responsive action of the parts is obtained in the movement of the type-wheel toward the platen of the paper-carriage.

20 A further object of the invention is to provide an improved construction embodying a single pinion carrying at one end a type-wheel and adapted to mesh with an independent rack carried upon each of the levers operated by the keys, together with means by which the extent of movement and the consequent extent of rotation of the type-wheel may be governed and controlled.

25 A further object of the invention is to provide a simple construction of parts by means of which the type-wheel and pinion may be shifted longitudinally for printing a different character of letter, if desired.

30 Other objects and advantages of the invention will hereinafter appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

35 In the drawings, Figure 1 is a plan with the end portions of the paper-carriage broken away. Fig. 2 is a longitudinal section through the keyboard mechanism and cooperating parts. Fig. 3 is a vertical cross-section on the line 3-3 of Fig. 2. Fig. 4 is a detail perspective of one of the key-levers adapted to operate the pinion. Fig. 5 is an elevation of a type-key, and Fig. 6 is a similar view of a modified form of key.

40 Like letters of reference indicate like parts throughout the several figures of the drawings.

As illustrating the application of this invention, the several cooperating mechanisms, which may be of any desired construction, 55 such as the paper-carriage and its tension devices and cooperating dogs, have been generally shown in the several figures, and therefore only passing reference will be made thereto. The paper-carriage A is adapted to 60 ride upon suitable ways A' and is provided with a platen B, while the carriage is moved from right to left by means of a suitable tension device B, connected by a flexible connection B' with a coil-spring B², carried by the 65 carriage, as is usual in this construction of carriage. The carriage is also provided with a feed-rack C, adapted to cooperate with any desired construction of dog mechanism C', by means of which the carriage will be fed step 70 by step in the oscillatory movement of the operating-dog.

The keyboard D of the machine is supported so as to be movable toward and from the carriage, preferably by means of pivoting at the 75 forward end, as shown. This pivot may be of any desired construction—for instance, a cross-bar D', having pintles adapted to rest in posts D², which may be provided with adjustable bearing-nuts D³, if so desired, for 80 centering the pintles and maintaining the same under proper tension. This keyboard is supported in its elevated position by any desired form of yielding means—for instance, a spring D⁴, having an extended end portion 85 D⁵. At the opposite ends of the keyboard D standards E are secured, within which the shaft F, adapted to support at one end the type-wheel F', is journaled, while the central portion of this shaft is provided with a pin- 90 ion or gear-teeth F², which may be of any desired construction or configuration. Above this pinion a guide-frame E' is provided and has formed therein a series of apertures for the reception of the rods G', extending from 95 the type-keys G. Each of these rods is adapted to be connected with a type-lever H, pivoted upon bearing-rods H', disposed at opposite sides of the machine and supported at their ends in the cross-plates E². Each of 100 these type-levers is also provided with a segmental plate H³, having at its upper portion a series of teeth H⁴ of substantially equal length, and provided at its lower portion with

a plain non-operating portion H^5 . The levers H are normally held in their elevated positions, as shown, by means of a spring H^6 , extending from the end of the lever beyond the pivotal point H' and connected to a fixed part of the movable keyboard D .

From the foregoing description it will be seen that the depression of the type-lever H will cause a rotation of the type-wheel F' , and this may be effected by regulating the number of teeth H^4 upon the rack-bar carried by the lever. For the purpose of positively determining and regulating the extent of movement of the type-lever I have provided in the base-plate of the movable type-board a series of set-screws I , adapted to contact with the lower end of the rack-plate carried by the levers. It will be seen that an adjustment of these set-screws positively determines the extent of throw to be given the lever, and consequently the character upon the type-wheel which is to be brought into position at a printing-point, while the non-operating portion of the rack-plate permits a free operation of the pinion by any single lever and key without affecting any other lever of the series. This non-operative portion also permits a convenient shifting of the type-wheel from a lower to an upper case character, which may be accomplished through the mechanism shown in the drawings, wherein the forward or front end of the shaft F is supported in additional bearings E^3 and E^4 , while it is held in one position by means of a tension-spring J bearing against the collar J' upon the shaft. At the upper end of the standard E^5 a key J^2 is provided with a crank-lever J^3 , carrying at one end a cap J^4 , adapted to engage the end of the shaft F and in the downward movement of the key J^2 move this shaft longitudinally and place the spring J under compression.

The rods G' of the several keys G may be connected to the levers H by any desired means to permit movement of the keys in a straight line—such, for instance, as shown in the drawings, where a slot G^2 is provided, so that the lower end of the rod of the key straddles the free end H^7 of the lever H , and has a sliding contact therewith upon the shoulder g . This permits a key to be moved in a vertical plane by reason of the guide provided by the bearing in the guide-plate E' and keyboard D , while the lever is free to travel in the arc determined by its pivot. The spring H^6 through the medium of the lever elevates the key to its normal position immediately after being released. In Fig. 6 a modified form of key is shown, wherein the lower portion is provided with a lip G^3 also adapted to straddle the free end H^7 of the key-lever, whereby the functions described to the slotted lever may be also performed. A suitable form of space-key C^2 is also provided and extends upward into a convenient position at the front of the machine, while the inner end of this key is connected to a rock-shaft C^3 , journaled in posts C^4 , carried

by the base of the machine. Upon this rock-shaft a plate C^5 is secured, which carries at one end the dog mechanism C' , and at its opposite end C^6 is connected by means of a spring-bar C^7 with a movable keyboard D , whereby the depression of said board in operating a key and performing the printing function causes an operation of the space mechanism and the consequent necessary travel of the paper-carriage. At the rear of the machine an inking-lever K is suitably pivoted at its upper end K' and provided at its lower end with an inked roll K^2 , adapted to be engaged by the end f of the shaft of the key-wheel F' in the downward movement thereof, which forces said lever and roll backward toward its supporting-frame K^3 , thus inking the type to be used and removing the inking device from proximity to the type wheel or platen. This inking device is returned to its normal position beneath the type-wheel by gravity.

From the foregoing description the structure and general operation of the several parts will be understood, so that it will be seen that when a key G is depressed the rack carried thereby engages the pinion F^2 of the type-wheel and turns the same to the extent necessary to bring the predetermined character over the printing-point of the platen B . This movement places the spring H^6 under tension and brings the non-operative end portion of the rack H^3 into contact with the set-screw I , which determines the movement of the parts, as shown by dotted lines in Fig. 3, and the continued movement depresses the keyboard and type-wheel to perform the printing. When pressure upon the key is released, the spring H^6 at once elevates the free end H^7 of the lever and brings the key to its normally-raised position, bringing the non-operative portion H^5 of the rack opposite the pinion F^2 , whereby the same can be moved by any key of the series without affecting any other key. It may be stated that the springs H^6 for controlling the key-levers are of such tension that the pinion F^2 and type-wheel carried thereby will be operated to bring the character in position for printing before the movable keyboard reaches the point where the key-wheel will print a character upon paper carried on the platen B . It will also be seen that this single pinion or operating-shaft for the type-wheel may be longitudinally shifted to use different sets of characters thereon and in connection with the structure of key and lever just described the structure presents one possessing a positive and direct actuation of the type-wheel, requiring the minimum expenditure of power by the operator and presenting a structure whose simplicity permits the economical manufacture of the machine. This simplicity of construction also reduces the danger of disarrangement of the parts and permits the quick and ready repair if breakage or disarrangement should occur, while the structure

taken as a whole permits the production of a practical machine adapted for every ordinary use, which by reason of its size, weight, and cost effects a material improvement in this art.

It is obvious that changes may be made in the details of construction and configuration of the several parts and that also other forms of carriage mechanism and coöperating parts may be substituted without affecting the spirit of the invention as defined by the appended claims.

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

1. In a type-writer, an actuating-shaft provided with a type-wheel, a series of pivoted key-levers adapted to engage said shaft and rotate said wheel through different arcs, and keys movably connected to said levers to permit a movement of the keys in a straight line; substantially as specified.

2. In a type-writer, an actuating-shaft provided with a type-wheel and pinion, a series of keys having racks adapted to engage said pinion and rotate said wheel through different arcs, and means for limiting the movement of said keys in different degrees; substantially as specified.

3. In a type-writer, an actuating-shaft provided with a type-wheel, a series of keys adapted to engage said shaft and rotate said wheel through different arcs, means for limiting the movement of said keys in different degrees, and means for shifting said shaft longitudinally independent of said keys; substantially as specified.

4. In a type-writer, the combination of a pivoted movable keyboard, having supported therefrom an actuating-shaft provided with a type-wheel, a series of keys adapted to engage said shaft and rotate said wheel through different arcs, and means for limiting the movement of said keys in different degrees; substantially as specified.

5. In a type-writer, the combination of a pivoted keyboard having supported thereon an actuating-shaft provided with a type-wheel, of a key-lever pivoted at one side of said shaft and provided with an actuating-face extending into contact with said shaft, means for normally elevating the free end of said lever, and a key adapted to depress the free end of said lever; substantially as specified.

6. In a type-writer, the combination with an actuating-shaft provided with a type-wheel, of a key-lever pivoted at one side of said shaft and provided with an actuating-face extending into contact with said shaft, means for normally elevating the free end of said lever, a key adapted to depress the free end of said lever, and an adjustable stop adapted to engage the end of the contacting portion carried by said lever; substantially as specified.

7. In a type-writer, the combination of a

type-wheel, a pinion for rotating the wheel, a series of pivoted key-levers having actuating-segments provided with toothed portions of substantially equal length and a non-operating face at its lower portion, and adjustable stops beneath said levers; substantially as specified.

8. A key-lever for type-writers having a central arched portion and pivoting means and an actuating-segment having rack-teeth at its upper portion and a non-operating face at its lower portion, in combination with a key adapted to movably straddle a portion of said lever to permit a straight movement of the keys; substantially as specified.

9. In a type-writer, the combination with a carriage, of a movable keyboard yieldingly supported above said carriage, a shaft provided with a pinion thereon, a type-wheel upon one end of said shaft above said carriage, a guide-frame supported from said keyboard, a key having its rod guided in said frame for vertical movement, a lever pivoted adjacent to said pinion and provided with rack-teeth to engage said pinion, and means for elevating said lever and key; substantially as specified.

10. In a type-writer, the combination with a carriage, of a movable keyboard yieldingly supported above said carriage, a shaft provided with a pinion thereon, a type-wheel upon one end of said shaft above said carriage, a guide-frame supported from said keyboard, a key having its rod guided in said frame for vertical movement, a lever pivoted adjacent to said pinion and provided with rack-teeth to engage said pinion, means for elevating said lever and key, and an adjustable stop for limiting the downward movement of said lever; substantially as specified.

11. In a type-writer, the combination with a carriage, of a movable keyboard yieldingly supported above said carriage, a shaft provided with a pinion thereon, a type-wheel upon one end of said shaft above said carriage, a guide-frame supported from said keyboard, a key having its rod guided in said frame for vertical movement, a lever pivoted adjacent to said pinion and provided with rack-teeth to engage said pinion, means for elevating said lever and key, an adjustable stop for limiting the downward movement of said lever, and means for moving said pinion longitudinally; substantially as specified.

12. In a type-writer, the combination with a carriage, of a movable keyboard yieldingly supported above said carriage, a shaft provided with a pinion thereon, a type-wheel upon one end of said shaft above said carriage, a guide-frame supported from said keyboard, a key having its rod guided in said frame for vertical movement, a lever pivoted adjacent to said pinion, and provided with rack-teeth to engage said pinion, means for elevating said lever and key, an adjustable stop for limiting the downward movement of said lever, means for moving said pinion longitudinally,

and a spring surrounding said pinion and bearing upon a collar thereon to restore the same to its normal position after movement; substantially as specified.

5 13. In a type-wheel type-writer, a shaft provided with a pinion thereon, a type-wheel upon the free end of said shaft, a key-lever pivoted at one side of said shaft and provided with a central arched portion, a series of rack-teeth
10 adapted to engage said pinion, and an independent key having a rod adapted to movably embrace the free end of said lever and guide the movement thereof; substantially as specified.

15 14. In a type-wheel type-writer, a shaft provided with a pinion thereon, a type-wheel upon the free end of said shaft, a key-lever pivoted at one side of said shaft and provided with a central arched portion, a series of rack-teeth
20 adapted to engage said pinion, and an independent key having a rod adapted to movably embrace the free end of said lever and guide the movement thereof, a spring connected to said lever beyond the pivotal point thereof,
25 and a stop adapted to be engaged by said lever in the downward movement thereof; substantially as specified.

15. In a type-wheel type-writer, a shaft provided with a pinion thereon, a type-wheel upon

the free end of said shaft, a key-lever pivoted 30 at one side of said shaft and provided with a central arched portion, a series of rack-teeth adapted to engage said pinion, a key having a rod adapted to movably embrace the free end of said lever and guide the movement 35 thereof, a spring connected to said lever beyond the pivotal point thereof, a stop adapted to be engaged by said lever in the downward movement thereof, a key mounted to engage an end of said shaft for moving the same longitudinally, and a spring for restoring said 40 shaft to its initial position; substantially as specified.

16. In a type-writer, the combination of a keyboard carrying a type-wheel and adapted 45 to oscillate in a vertical plane, means to rotate said wheel and move said keyboard, a movable carriage beneath said wheel, an ink-roller adapted to swing to and from said wheel, and means for moving said roller in 50 the movement of said wheel; substantially as specified.

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

ARTHUR C. FERGUSON.

Witnesses:

E. B. ROCKWELL,
WM. E. BRILL, Jr.