

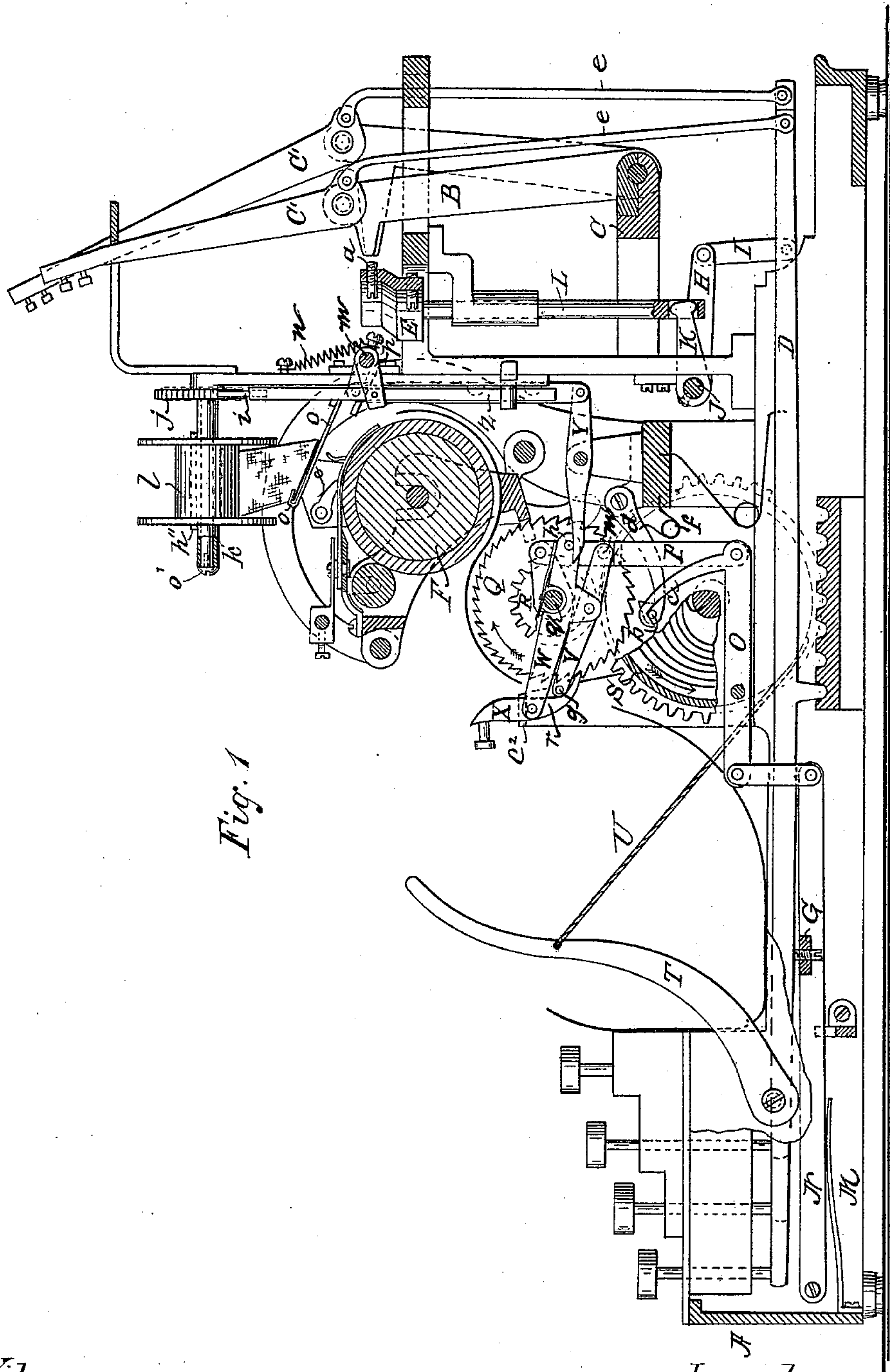
(No Model.)

4 Sheets—Sheet 1.

B. A. BROOKS.  
TYPE WRITING MACHINE.

No. 438,985.

Patented Oct. 21, 1890.



Witnesses:

Cha. <sup>9</sup>/<sub>10</sub> Peabody  
Jesse Hull

*Inventor.*

Byron A. Brooks

(No Model.)

4 Sheets—Sheet 2.

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Fig. 2.

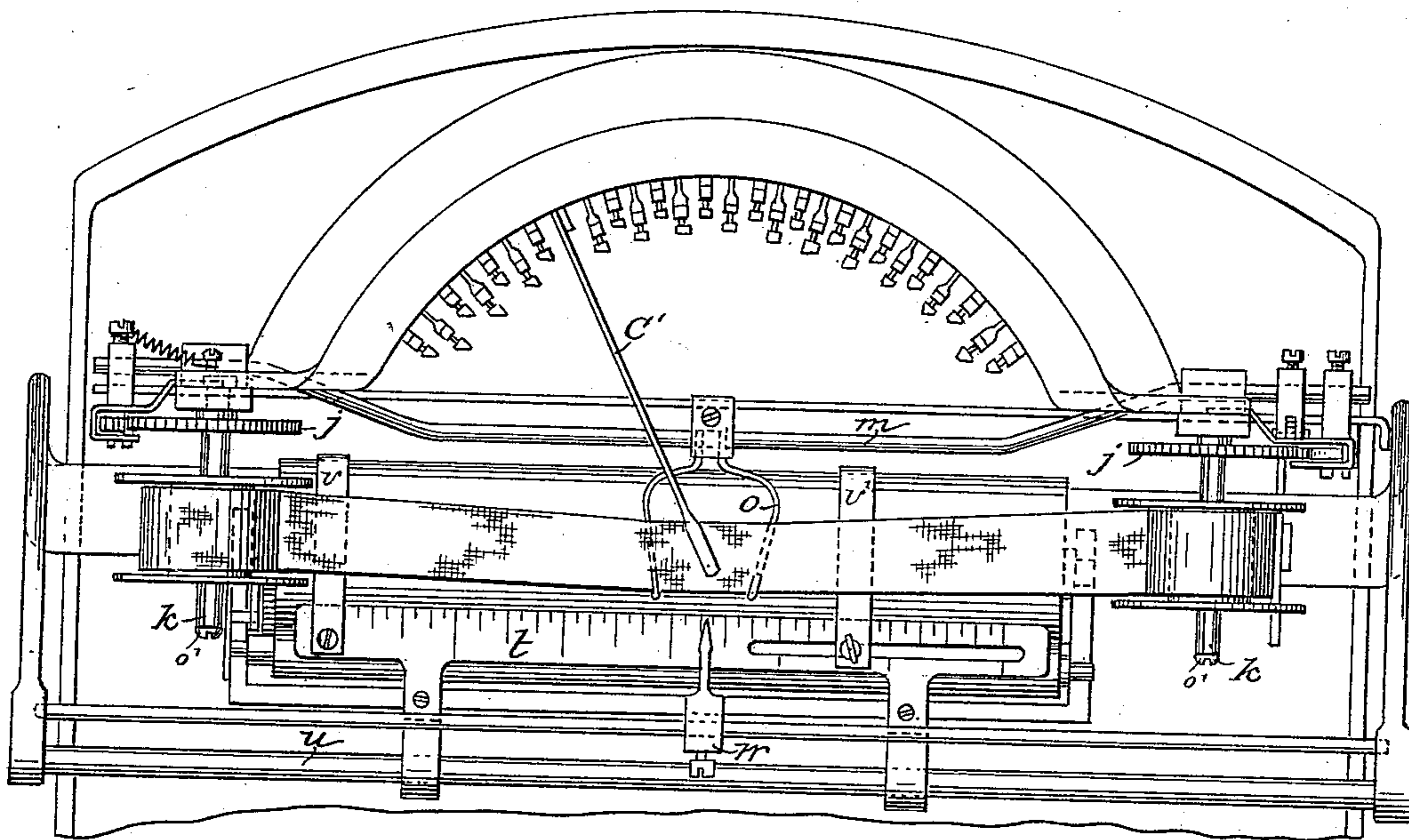
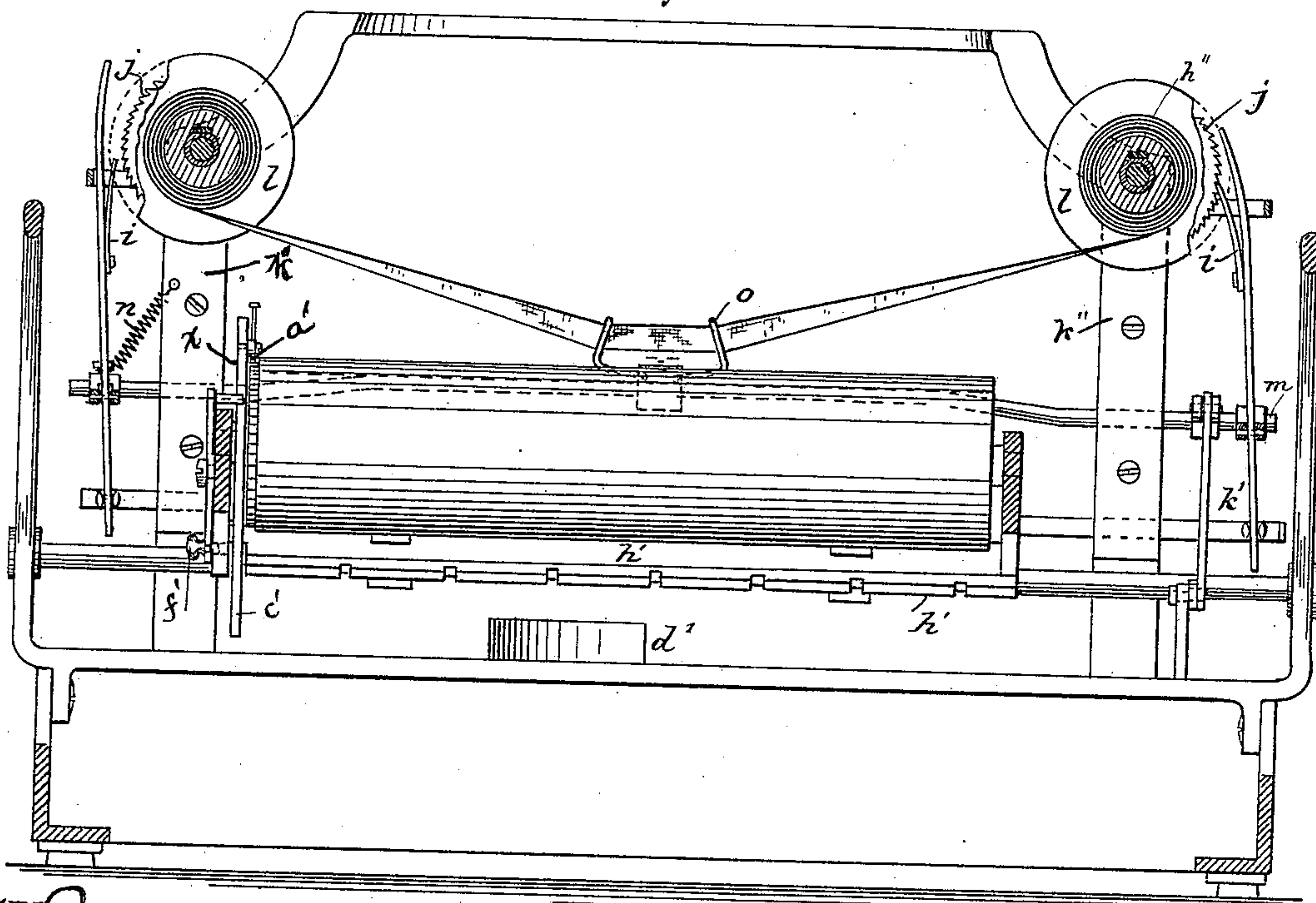


Fig. 3.



Witnesses.

James M. Pull  
James R. Taylor

Inventor.

Byron A. Brooks

(No Model.)

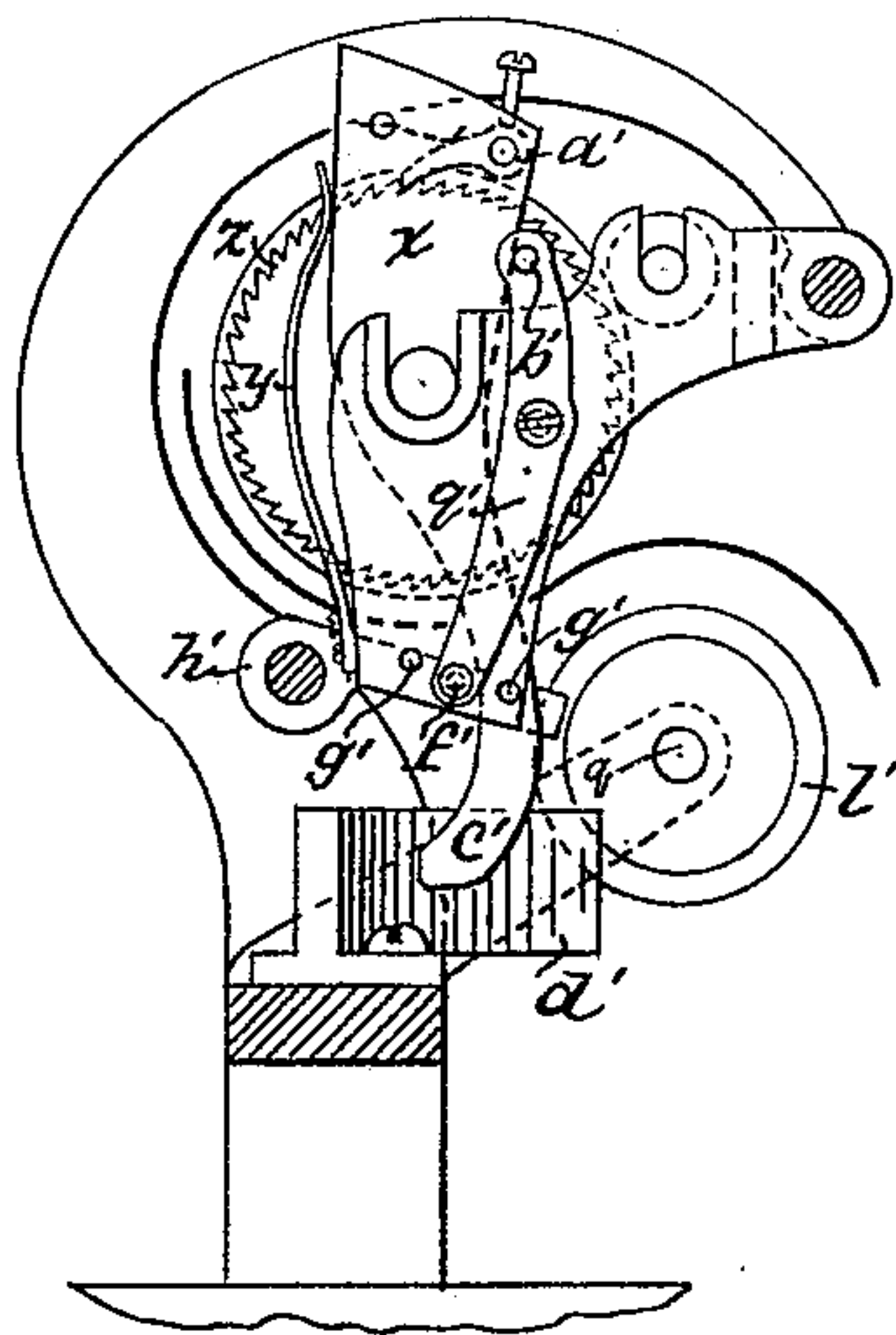
4 Sheets—Sheet 3.

B. A. BROOKS.  
TYPE WRITING MACHINE.

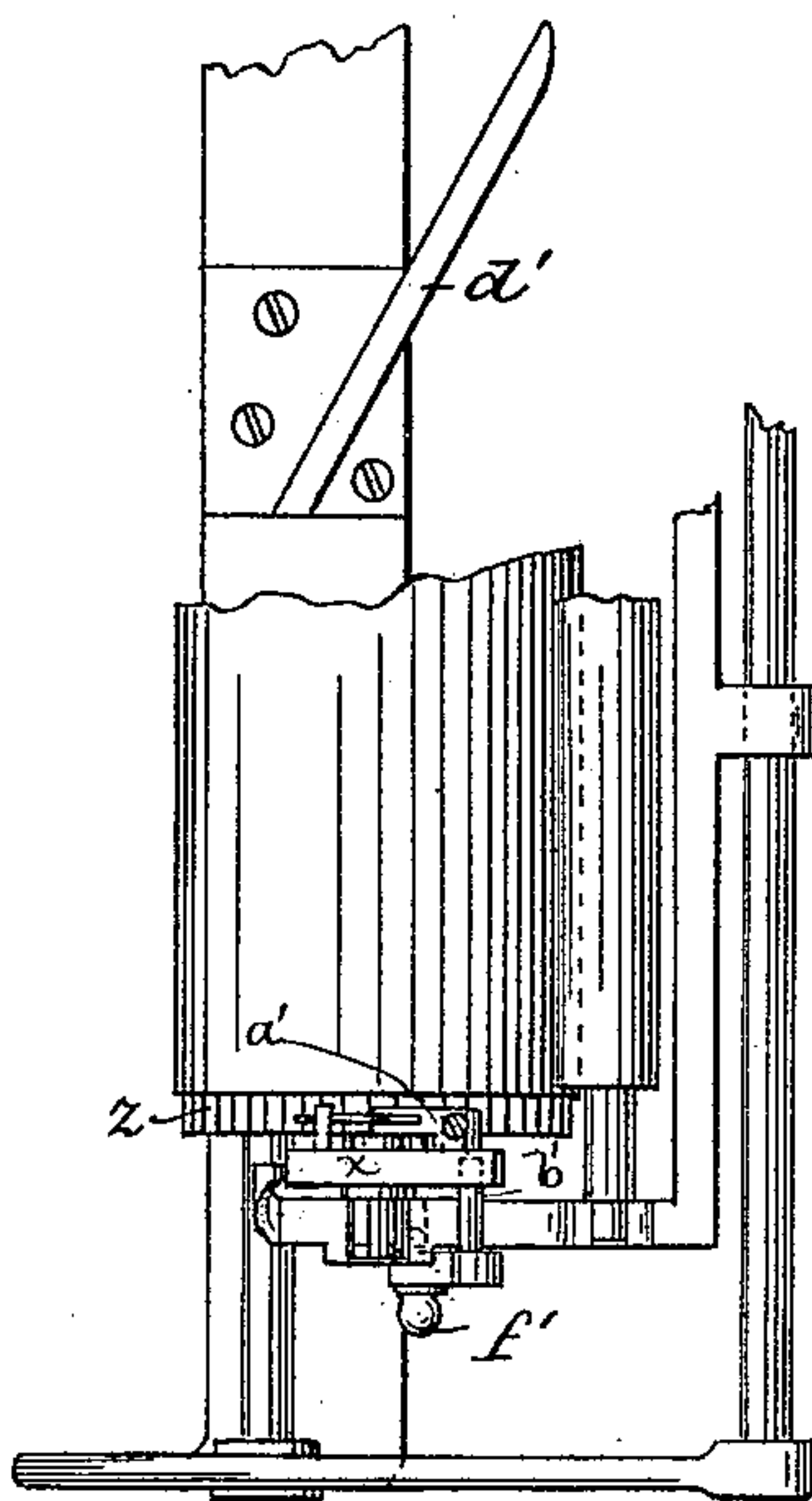
No. 438,985.

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*Fig. 4.*



*Fig. 5.*



Witnesses.

*James R. Taylor*

Inventor.

*Byron A. Brooks*



(No Model.)

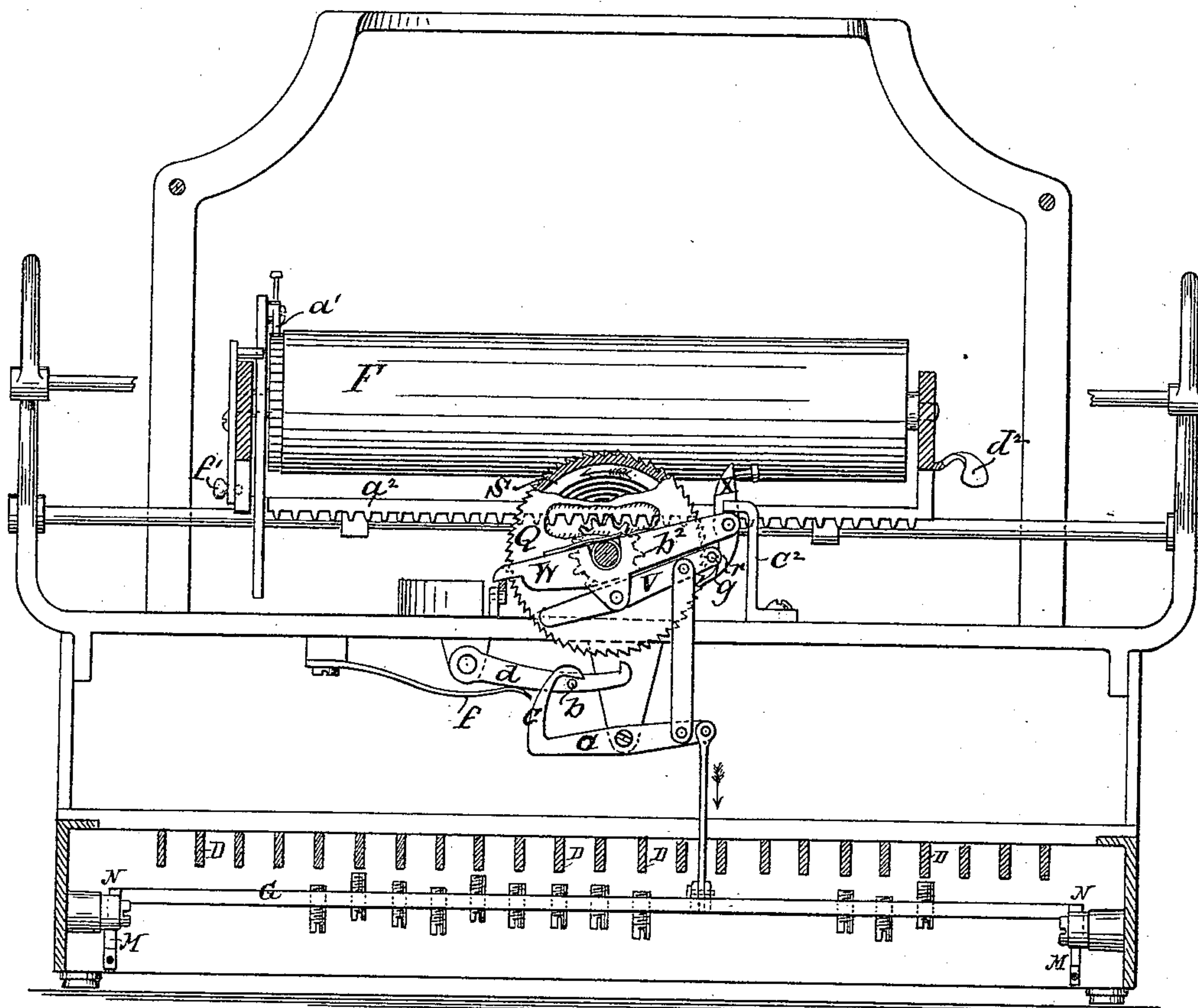
4 Sheets—Sheet 4.

B. A. BROOKS.  
TYPE WRITING MACHINE.

No. 438,985.

Patented Oct. 21, 1890.

*Fig. 6.*



Witnesses.

*Samuel R. Taylor*

Inventor.

*Byron A. Brooks*

# UNITED STATES PATENT OFFICE.

BYRON A. BROOKS, OF BROOKLYN, NEW YORK.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 438,985, dated October 21, 1890.

Application filed March 23, 1886. Serial No. 196,215. (No model.)

*To all whom it may concern:*

Be it known that I, BYRON A. BROOKS, a citizen of the United States, residing 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 description in such full, clear, concise, and exact terms as will enable any one skilled in the art to which my invention relates to make and use the same, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon.

Figure 1 illustrates a side elevation partly in section of my improved machine. Fig. 2 illustrates a top view of the platen-carriage and its adjacent parts. Fig. 3 illustrates a front elevation of the same, and Figs. 4, 5, and 6 detail parts thereof.

Similar letters of reference indicate corresponding parts in all the figures of the drawings.

My present invention consists in certain novel devices and combinations of devices constituting improvements in type-writing machines. These features are applicable to many forms of type-writers now in common use; but they are especially designed as improvements upon type-writers heretofore patented by me, especially such machines as are shown in Patents No. 323,495, dated August 4, 1885, and No. 423,900, dated March 25, 1890, to which reference is here made.

I do not deem it necessary to particularly describe those features of the machine illustrated in the annexed drawings, whose functions and construction are now well known, or which have been particularly designated in my former patents; but I shall here confine myself more especially to the description of the features of the machine which constitute my present improvements.

Referring to Fig. 1, C' are bell-crank type-bars, each bearing two or more printing-types, said bars being pivoted to supports B, which are in turn pivoted to a stationary support C. The short arms of the bell-crank type-bars are connected to the ends of the key-levers D by means of a link or rod e. The stop-piece E, formed into a series of steps corresponding in number to the types upon the several type-

bars, forms a stop to arrest the forward movement of the type-bars to bring the desired type to the printing-point when they are thrown down against the platen F. The position of this stop-piece is controlled by a key connected to the broken lever H I, which is attached to the rod J, free to turn upon its axis, to which the arms K are also attached, which arms K work in a slot in the standard L to move said standard longitudinally to adjust the elevation of the stop-piece E and to bring one or the other of the steps in said stop opposite the projection on the support B to regulate the forward movement of the type-bar. To further regulate the extent of this forward motion said steps are severally fitted with set-screws—one opposite each type-bar support B—by means of which the alignment of the several printing-types and all of them can be independently and with nicety adjusted. The action of the bar e when raised is not only to throw the type-bar down to the platen, but it also moves its support forward into contact with the stop-piece, thus obviating the necessity of a separate spring bearing against the back of these supports for this purpose, such as has heretofore been employed. This novel function of the bar e in this machine is due to the fact that said bar is pivoted on the key-lever D behind the pivot-point of the support B. Hence its action presses the support B forward at the same time that it throws the type-bar down to the printing-point.

G is a variable spacing-bar of ordinary construction bearing set-screws, against which the several key-levers strike to space between letters. This spacing-bar is carried by a pivoted arm N. This arm, through the spacing-bar, is depressed a given distance when each type-lever is operated, and is returned to its normal position thereafter by the agency of the spring M. This bar G is connected by a link to the pivoted bar O, having its end fashioned into a hook extending over but not attached to the pin b carried by the pivoted hooked arm d. The arm P is pivoted to the arm O and is connected to the shaft q of the worm-wheel l', Fig. 4, by a loose link surrounding said shaft for the purpose of holding the rod P in an upright position. This worm-wheel shaft bears the disk Q, having its



periphery cut into ratchet-teeth. It also bears a gear-wheel R, meshing in the gear-teeth of the drum S, containing a spiral spring, which is wound up by drawing the lever-arm T toward the left hand, Fig. 1, said arm being attached to said drum by a cord U, wrapped around the periphery thereof. Instead of said spiral spring any suitable device for storing energy may be employed, such as a weight, for example, or, indeed, any device which in an escapement performs the functions of said spiral spring.

An arm W, pivoted to the worm-wheel shaft, bears the pivoted pawl X and also bears, pivoted from an extension in its lower side, the arm V, carrying a pin *g* and a pin *m*, resting on top of a shoulder cut on the arm P. The arm W, which carries the pawl X, carries upon its opposite end a pin *h*, which rests on the top of the pivoted arm Y. This arm is connected to the upright piece Z, susceptible of longitudinal motion in its bearings and carrying at its upper extremity a pawl *i*, meshing with the ratchet-teeth on the wheel *j*, fast to the sleeve *k*, which carries the inking-ribbon spool *l*. (See Figs. 1, 2, and 3.) This upright piece Z also actuates a rod *m* by means of a short arm *p*, causing said rod to oscillate on its axis, and this rod *m* bears and actuates the ribbon-guide *o*. The ribbon-spools *l* are carried by the rods *k''* and sleeves *k*. These sleeves (see Fig. 3) may be planed flat on their upper sides, on which flat surface a flat spring *h<sup>2</sup>*, carried by the spools, bears, thereby preventing the spool revolving independently of said sleeve and permitting the spool to be easily pulled off and slipped on the same. The spring *n*, attached to the rod *m*, carrying the ribbon-guide forks, acts in the same direction as the weight of the upright piece Z and its attendant parts to push down said upright piece after it has been pushed up by the agency described. The spring *n* may of course be dispensed with and gravity or other suitable means relied on to return the ribbon-guide to its initial position, which is the function of the spring *n*. The operation of these parts is as follows: Whenever a type-bar is depressed, the adjustable space-bar G and the lever N to which it is attached are thrown down, thereby elevating the hooked end of lever O and permitting the hooked end of the arm *d* under the influence of the spring *f* to rise and make connection with the ratchet-teeth on the disk Q, preventing said disk from revolving under the influence of the coiled spring in the drum S in the direction indicated by the arrow. The arm P, carried by the lever O, at the same time causes the arm V to push the pawl X out of connection with the ratchet-wheel Q, and said arm V, continuing its travel, strikes against the arm W at that end which bears the pin *h*, thereby revolving the arm W with a left-hand revolution. At the same time the arm Y, by means of the weight of the upright piece Z and the spring *n*, being relieved of the pressure of

the stop-pin *h*, follows that pin in its ascent. This throws the upright piece Z down and causes the pawl *i* to travel downward, slipping over the ratchet-teeth on the wheel *j*. At the same time the upright piece Z, by means of the short arm *p*, causes the rod *m*, bearing the ribbon-guide forks, to turn and throw said forks down to or near the circumference of the platen, carrying the inking-ribbon with it. At the same time one of the types of the machine descends and prints a character upon the platen. Now, when the key is released and its key-lever returns to its initial position, the following actions occur: In the first place, the arm V releases the pawl X, which now falls into the ratchet-tooth opposite it on the disk Q. Then the hooked arm *d* is caught by the hook on the arm *c* and is drawn out of connection with the ratchet-teeth on the disk Q. Then the disk Q, attached to shaft *q* of the worm-wheel, revolves under the influence of the coiled spring of the drum S in the direction opposite to that indicated by the arrow. This revolution continues until the arm W strikes against the stop *p<sup>3</sup>*. Thus the feeding worm-wheel is revolved, and the rack in which the worm meshes and which is attached to the platen carriage moves the platen forward to space between letters and to present a new surface to the succeeding type. The revolution of the arm W, just described, by means of the pivoted arm Y, raises the upright piece Z and causes the ratchet *i* to turn the wheel *j* a distance commensurate with the longitudinal movement of the upright Y. Thus the spool Z is turned and the inking-ribbon drawn forward. At the same time the inking-ribbon, by means of its guide-forks, is tilted or raised by the short arm *p* and rod *m*. In this arrangement not only is the platen moved forward by means of the power stored in the escapement-spring, but by the same means the inking-ribbon is fed and automatically operated, as described. This leaves the keys free to operate with a light elastic touch and increases not only the freedom with which the machine operates, but also improves the character of the work done.

Referring to Fig. 2, *t* represents the paper-guide marked with scale-graduations. It is attached to and moves with the platen-carriage and carries the fixed metal finger *v* and movable metal finger *v'*, which guide the paper around the platen and hold it close to its surface. These fingers *v* and *v'* are to be adjusted with reference to the width of paper used. W is a pointer, stationary when adjusted. In the drawings it is shown as adjusted to point always to the printing-point on the platen.

Referring to Fig. 4, X represents a pivoted arm oscillating about the axis of the platen. Said arm carries a pawl *a'*, bearing in the ratchet-teeth of the wheel *z*, attached to said platen. The lower end *c'* of the arm *x* rides up the incline *d'* when the platen-carriage is



drawn to its farthest right-hand position. The following is a description of the operation of this device: When the platen-carriage is drawn to its extreme right position, the end  $c'$  of the pivoted arm  $x$  rides up the incline  $d'$ , and by means of the pawl  $a'$  turns the wheel  $z$  and the platen attached thereto through a certain arc to space between lines. As the platen-carriage travels toward the left the end  $c'$ , actuated by the spring  $y$ , slips down the incline  $d'$ , and the pawl  $a'$  slips over the ratchet-teeth of the wheel  $z$  until the arm strikes the stop  $b'$ . This stop is carried by the arm  $e'$ , and its position is adjusted by means of the pin  $f'$ , passing through a hole in its lower end and setting in one or the other of the recesses  $g' g'$ , cut in the end of the rack  $h$ . By shifting the pin  $f'$ , passing through the rocking arm  $q'$ , into one or the other of these holes  $g'$ , the vibrations of the arm  $x$  are varied and limited, and hence the width of the line-space on the platen adjusted.

The manner in which the inking-ribbon is sustained and operated is clearly illustrated in Figs. 2 and 3. The standards  $k'' k''$ —one on each side of the machine on which the spools are held—are each provided with a ratchet-wheel  $j$  and a pawl  $i$ . This pawl is connected to the rod  $m$ , and both the pawls  $i i$  are attached to a sliding rod  $k'$ , as shown in Fig. 3, which, being moved longitudinally in one direction or the other alternately, throws first the one and then the other of the pawls in gear with its wheel, at the same time throwing the opposite pawl out of gear. When therefore all the ribbon has run off one spool, by simply shifting this bar the connections are reversed and the ribbon is gradually, step by step, wound back.

By the mechanism heretofore described it will be observed that the ribbon is fed automatically in both directions across the printing-point, and that with each type printed the ribbon moves forward a distance commensurate with the width of the type written, be it broad or narrow.

It is obviously desirable in type-writers that the letters and words as they are printed should always be in sight of the operator. To construct a practical machine employing an inking-ribbon and having this function is one of the principal objects of my invention. It will be seen that the printing-point is on the top of the platen; but if an inking-ribbon always held near the platen were used in connection with a platen so arranged the ribbon would effectually cover the print and avoid the very result which I desire to attain. It is plain that the ribbon must be at least intermittently raised some distance above the platen to expose the letters clearly to view. It has been proposed to sustain the ribbon above the platen in spring-holders, the types in descending being relied upon to strike against the ribbon on their way to the platen, and thus to carry it down to the printing-point; but experience has clearly demon-

strated that in order to secure a clear impression it is absolutely necessary that the ribbon should lie as near the platen as may be without blurring, and that it present practically no resistance to the traveling type, and besides it is demonstrated that the increased resistance which a ribbon so arranged adds to the action of the type-bars seriously affects the usefulness and efficiency of the machine. It is to avoid the difficulties and to accomplish the results above set forth that I have designed the means described for supporting and operating the ribbon. Before the types reach the printing-point the said forks will have drawn the ribbon down to or near the face of the platen, and as the type-bars return they will again raise the ribbon and expose to view the letter printed. The ribbon is brought down to the platen only near the printing-point, and, as the spools are supported above the platen, it rises on each side of the forks out of the line of vision, so that the greater part of the line is always in view.

Referring to Fig. 2, the scale  $f$  also acts as a guide to hold the paper on the platen. The pointer  $w$  is preferably set at the printing-point while the scale moves with the carriage. This, together with the fact that the printing-point is in view, enables the operator to correct and amend his text with far more facility than has hitherto been possible and without the annoyance of the usual computations and scale-readings.

By combining the inking-ribbon guide with an escapement for operating it I relieve the keys of the work of vibrating the ribbon, and so avoid impairing their easy action, since the key-levers only act to let off the escapement which vibrates the ribbon. Besides this it will be observed that the inking-ribbon guide, vibrating in obedience to an independent force from that applied to operate the keys, can be made to move more rapidly than the type-bars, and hence bring the ribbon in position and at rest before it is struck by the types traveling to the printing-point.

The rods  $k$  on which the spools are set are so arranged that the spool can readily be slipped on or off of them, and thus the necessity for handling the ribbon is avoided. When the ribbon is worn out, all that is necessary to be done to replace it is to slip the spools off of their standards and slip a fresh pair on in their stead.

The standards on which the ribbon-spools are set consist of a central pin  $k^2$ , attached to the frame of the machine, said pin being surrounded by a loose wheel  $j$  and a loose sleeve  $k$  attached thereto. A friction-screw  $o'$ , set in the end of the pin  $k^2$ , bears against the end of the sleeve  $k$ . By tightening or loosening the screw  $o'$  the friction between its loose sleeve and its central pin is regulated. The object of this device is to regulate the feed of the ribbon and to provide for the necessary slack.

Fig. 6 illustrates another manner of apply-



ing the operation of the escapement to move the traveling platen to space between letters and words. A rack  $a^2$  is attached to the frame of the platen-carriage, and this rack meshes  
 5 into a pinion-wheel  $b^2$ , carried on the same shaft as the escapement-wheel Q. The devices for operating the escapement-wheel and pinion-wheel  $b^2$  are in all respects the same as those shown in Fig. 1; but in Fig. 6 the  
 10 escapement acts directly upon the platen-carriage to move the same, whereas in Fig. 1 it operates through a worm-wheel. To draw the platen-carriage back, the platen-carriage is moved longitudinally by means of the handle  
 15  $d^2$  to its initial position, at the same time winding up the escapement-spring.

In a patent granted to me August 4, 1885, No. 323,495, I have shown and described a device for operating an escapement similar in  
 20 some respects to that above described. In that device, instead of employing a pawl  $d$ , engaging in the ratchet-teeth of the wheel Q, which pawl is operated by a device—such as the hooked arm  $c$ , having an independent  
 25 motion with relation to said pawl  $d$ —I employed a prong working between pins set on the side of the escapement-wheel. Since said prong was positively attached to the variable spacing-bar of the machine, it necessarily had  
 30 a variable motion and could not act as a pawl to engage the ratchet-teeth on the escapement-wheel. In my present device it will be observed that the detent is a pawl and is not positively attached to the spacing-bar nor to  
 35 the mechanism which operates the pawl X, but that these pawls have different and therefore independent movements.

Having thus described my invention, I claim and desire to secure by Letters Patent  
 40 the following:

1. In a type-writing machine, the combination of a traveling platen, an escapement by which said platen is operated, printing-types, and a vibrating inking-ribbon moved in one  
 45 direction by said escapement, and means, substantially as described, for moving it in the opposite direction.

2. In a type-writing machine, the combination of a platen and printing-types, an inking-ribbon carried by a ribbon-guide, a rocking shaft parallel to said platen, to which said guide is attached and by which it is vibrated, means, substantially as described, for causing  
 50 said shaft to rock, and a pawl and ratchet operated by said shaft for feeding said ribbon.

3. In a type-writing machine, the combination of a pawl and ratchet for feeding the inking-ribbon, a vibrating guide through which said ribbon runs, and an escapement by means  
 60 of which the inking-ribbon is fed forward and is vibrated, substantially as described.

4. In a type-writing machine, and combined with a spring, a ratchet-wheel and two pawls alternately in gear with the ratchet-teeth on  
 65 said wheel, one of said pawls having a variable oscillating motion about the center of

said wheel in a direction opposite to the rotation of said wheel, substantially as described.

5. In a type-writing machine, and combined with a spring, a ratchet-wheel and two pawls  
 70 alternately in gear with the ratchet-teeth on said wheel, one of said pawls having a positive variable throw and the other acting as a detent, substantially as described.

6. In a type-writing machine, and combined  
 75 with an escapement ratchet-wheel, a spring operating said wheel, and a detent-pawl pivoted to a stationary support and normally out of gear with said ratchet-wheel, a spring constantly operating to throw said pawl in gear  
 80 with the ratchet-teeth on said wheel, and means, substantially as described, separate from and operating independently for intermittently engaging and drawing said pawl out of contact with said teeth.

7. In a type-writing machine, the combination of a type-bar bearing a plurality of types, a support to which it is attached, and a stop-piece provided with means, substantially as  
 90 described, for adjusting the printing-point of each of said type independently of the others, substantially as described.

8. In a type-writing machine, the combination of a type-bar bearing a plurality of types, a support to which it is attached, a stop-piece  
 95 provided with a series of steps commensurate with the number of types carried by said bar, and means, substantially as described, for adjusting the position of said stop-piece to print one or the other of said types, said steps being provided with set-screws for the purpose  
 100 of adjusting the printing-point of each of said types independently of the other, substantially as described.

9. In a type-writing machine, and in combination with the type-bars thereof, a support  
 105 to which it is attached, a stop-piece having a series of steps provided with adjustable set-screws against which said support strikes when thrown forward to print a type, and  
 110 means, substantially as described, for varying the position of said stop-piece to bring one or the other of said types in position to print on the platen, substantially as described.

10. In a type-writing machine, the combination of a key-board, a platen, an inking-ribbon, and type-bars set in the arc of a circle  
 115 attached to vibrating supports and arranged to strike down upon the platen, said platen being arranged between the said key-board and type-bars, and said inking-ribbon being suspended between said type-bars and platen, substantially as described.

11. In a type-writing machine, the combination of a type-bar, a vibrating support to  
 125 which it is pivoted, and a key-lever carrying a rod attached to said key lever and to said type-bar, substantially as described.

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Witnesses:

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 SAML. R. TAYLOR.