

(No Model.)

3 Sheets—Sheet 1.

B. A. BROOKS.
TYPE WRITING MACHINE.

No. 461,865.

Patented Oct. 27, 1891.

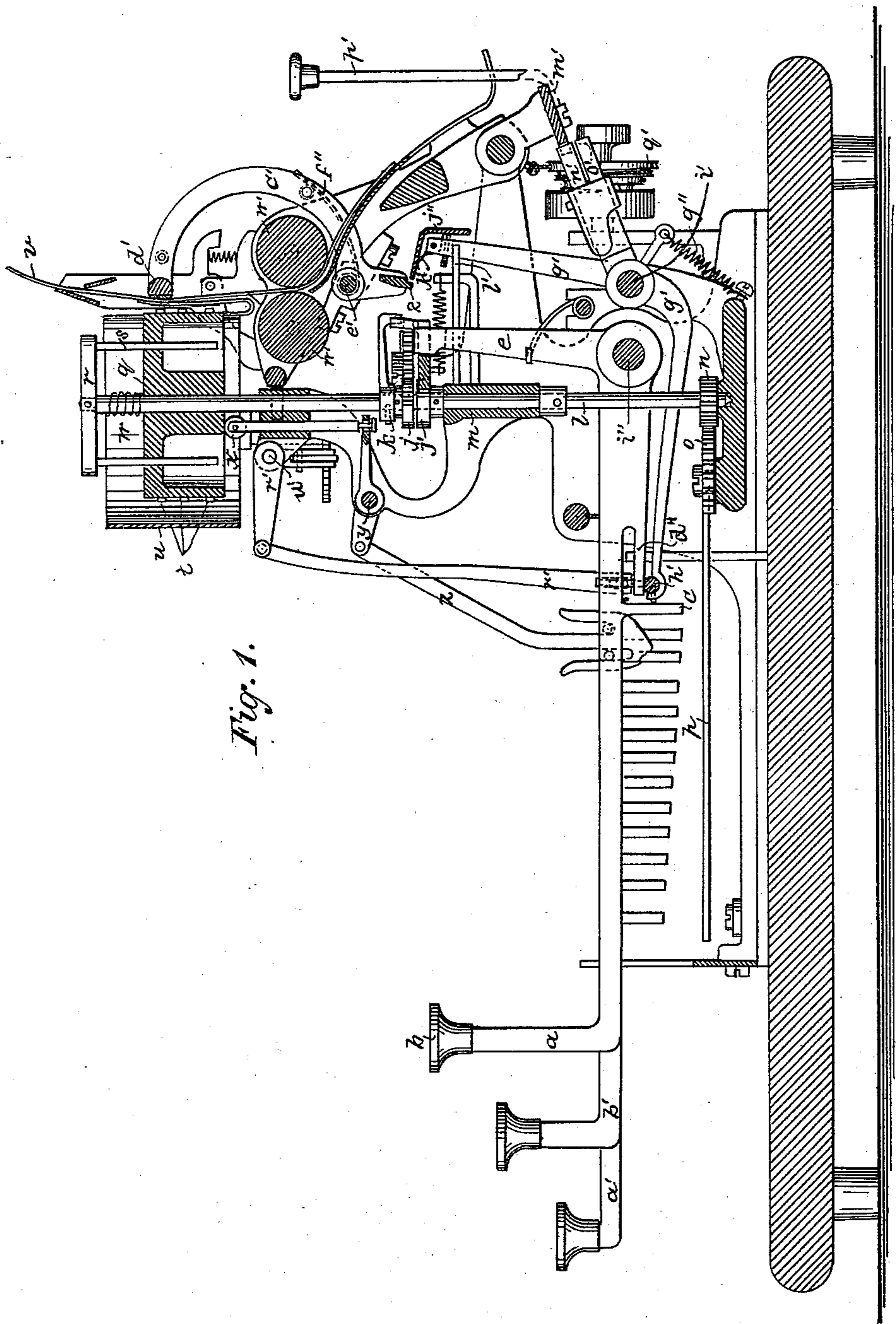


Fig. 1.

Witnesses.

Charles Raettig.
J. P. M. M. M.

Inventor.

B. A. Brooks

(No Model.)

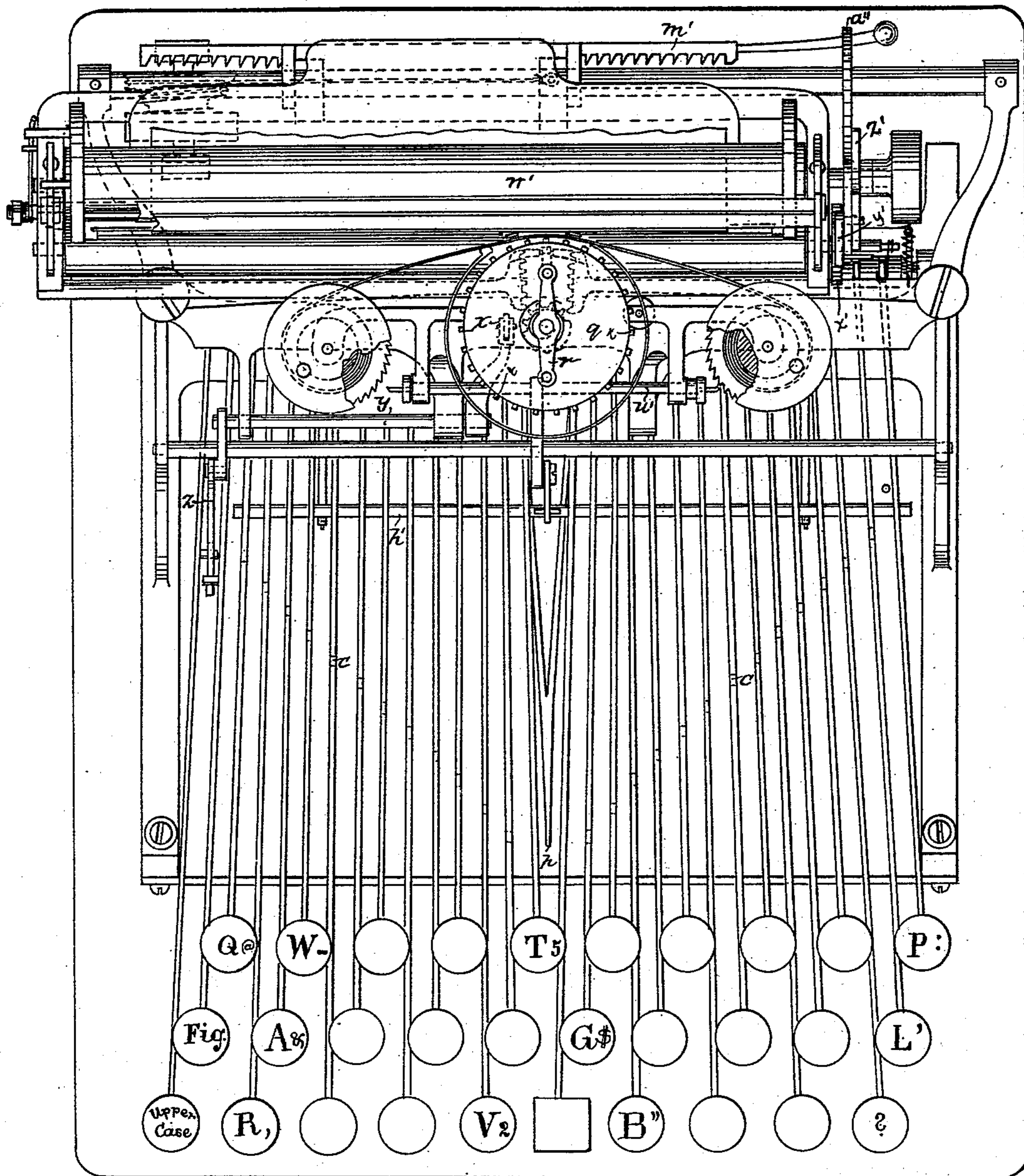
3 Sheets—Sheet 2.

B. A. BROOKS.
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Fig. 2.



Witnesses.

Charles Raettig
John Hill

Inventor.

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(No Model.)

3 Sheets—Sheet 3.

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Fig. 3.

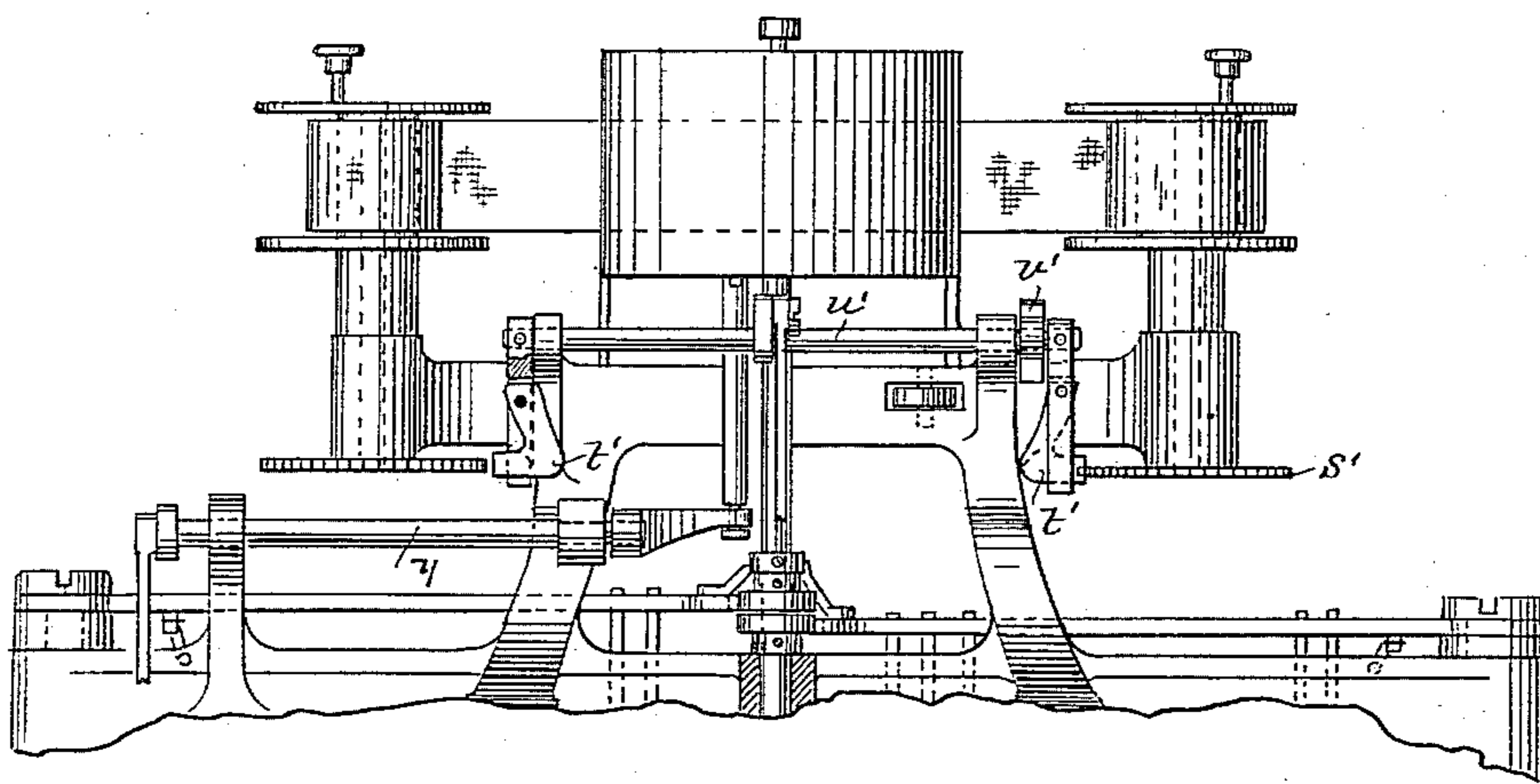


Fig. 4.

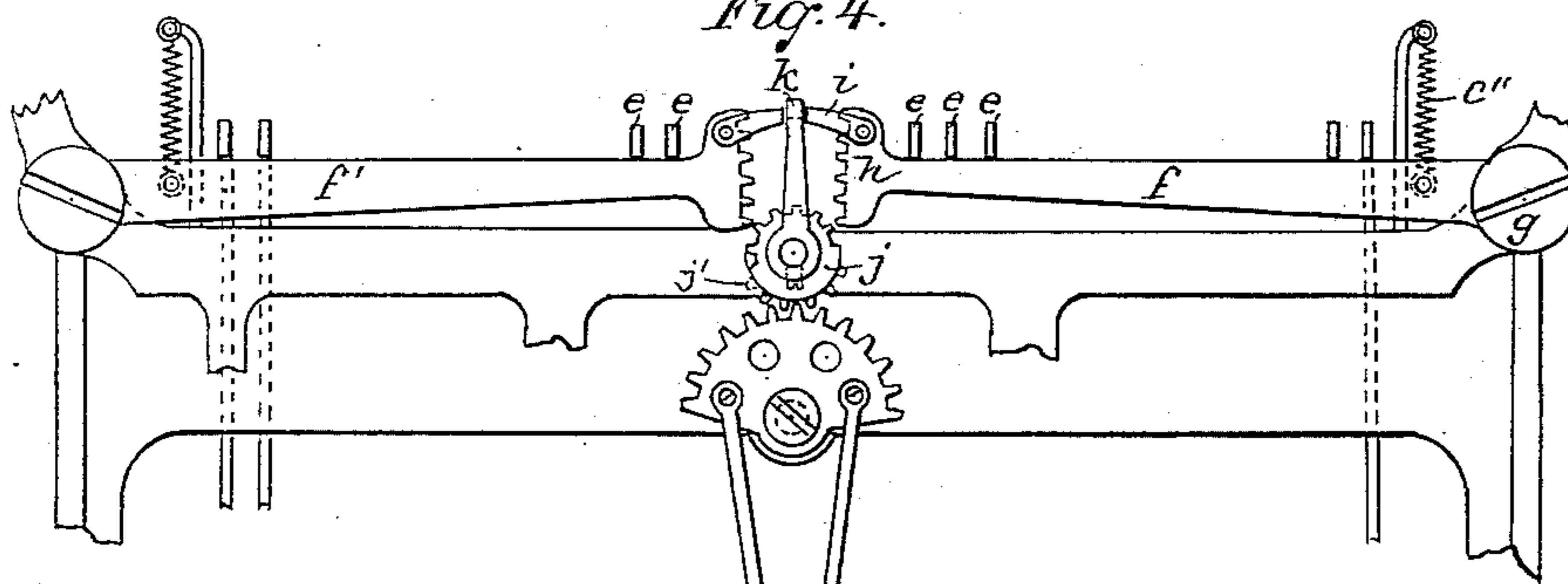


Fig. 5.

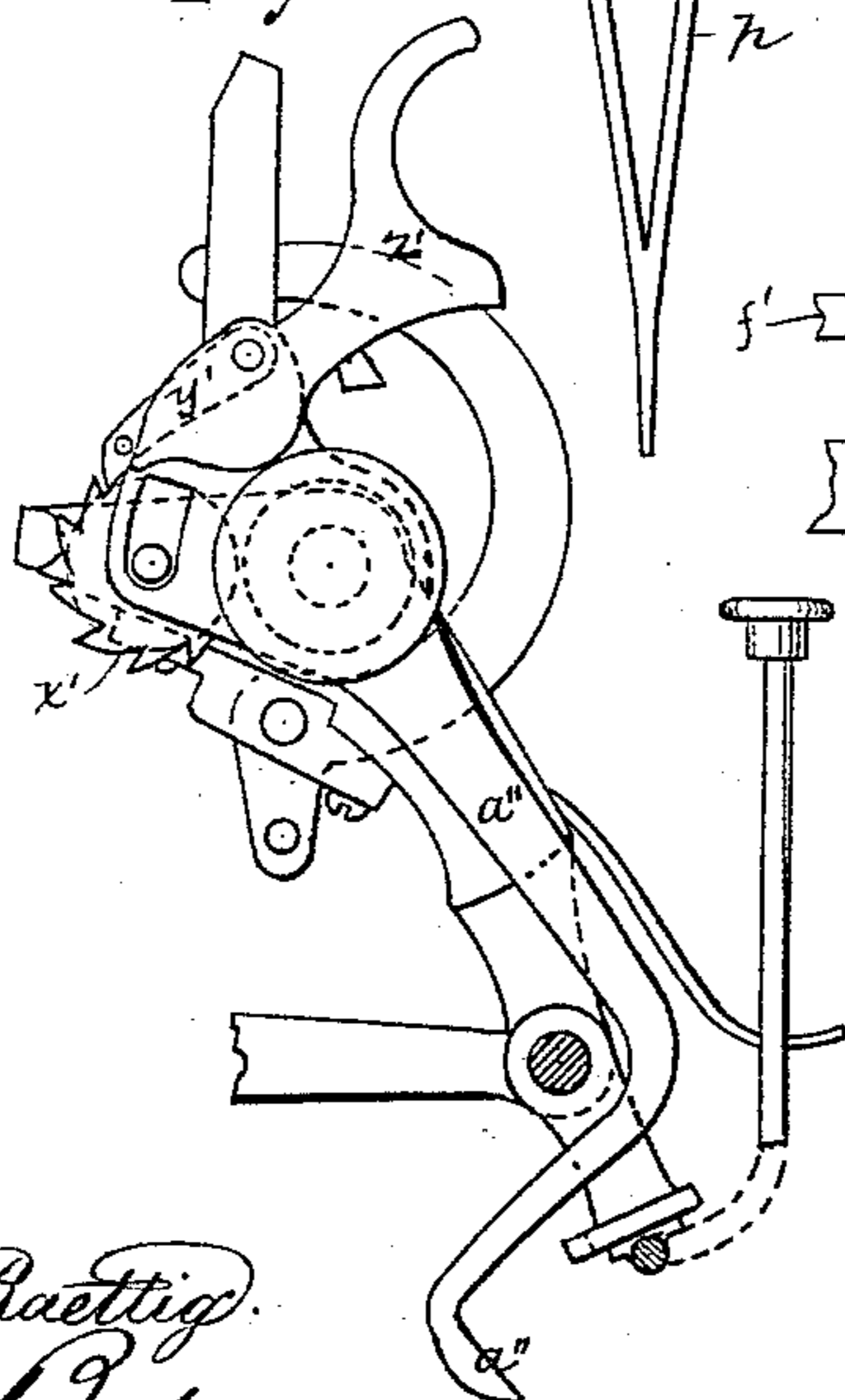


Fig. 6.

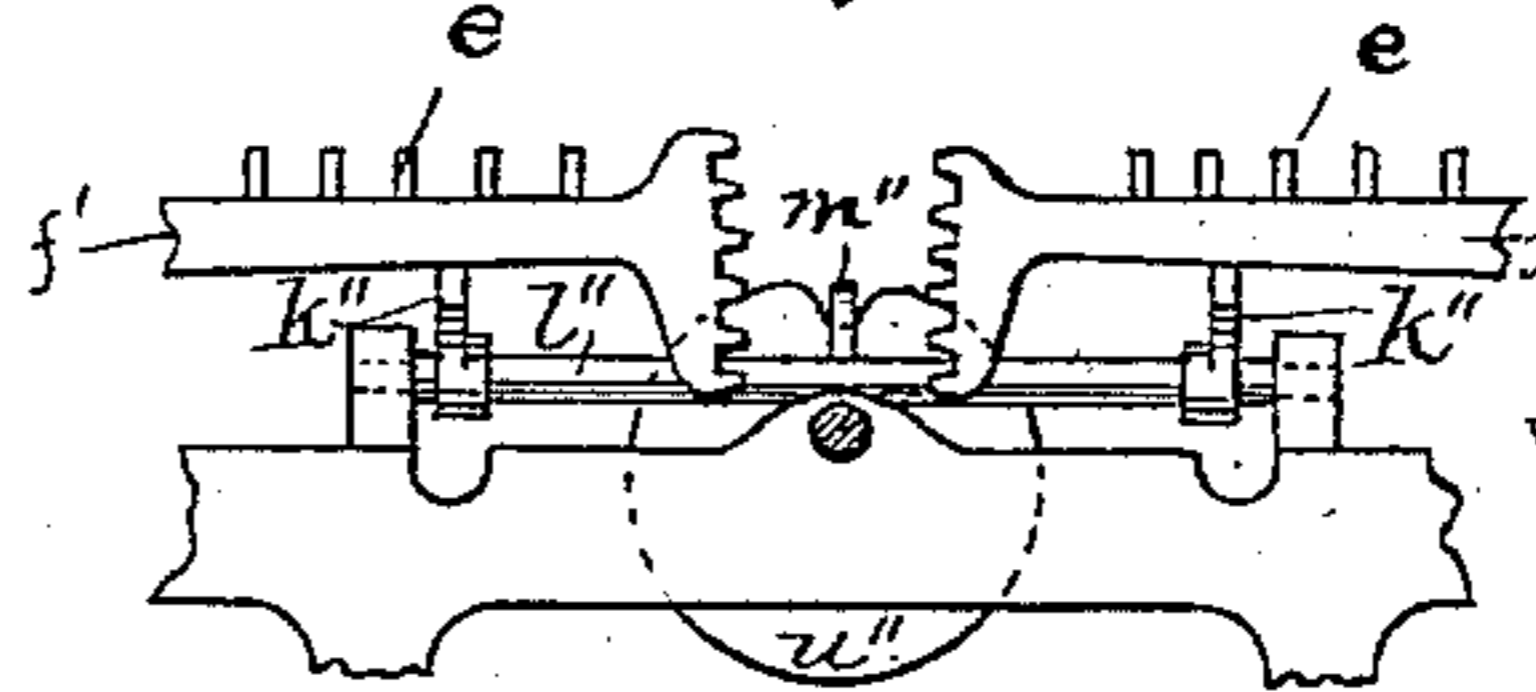
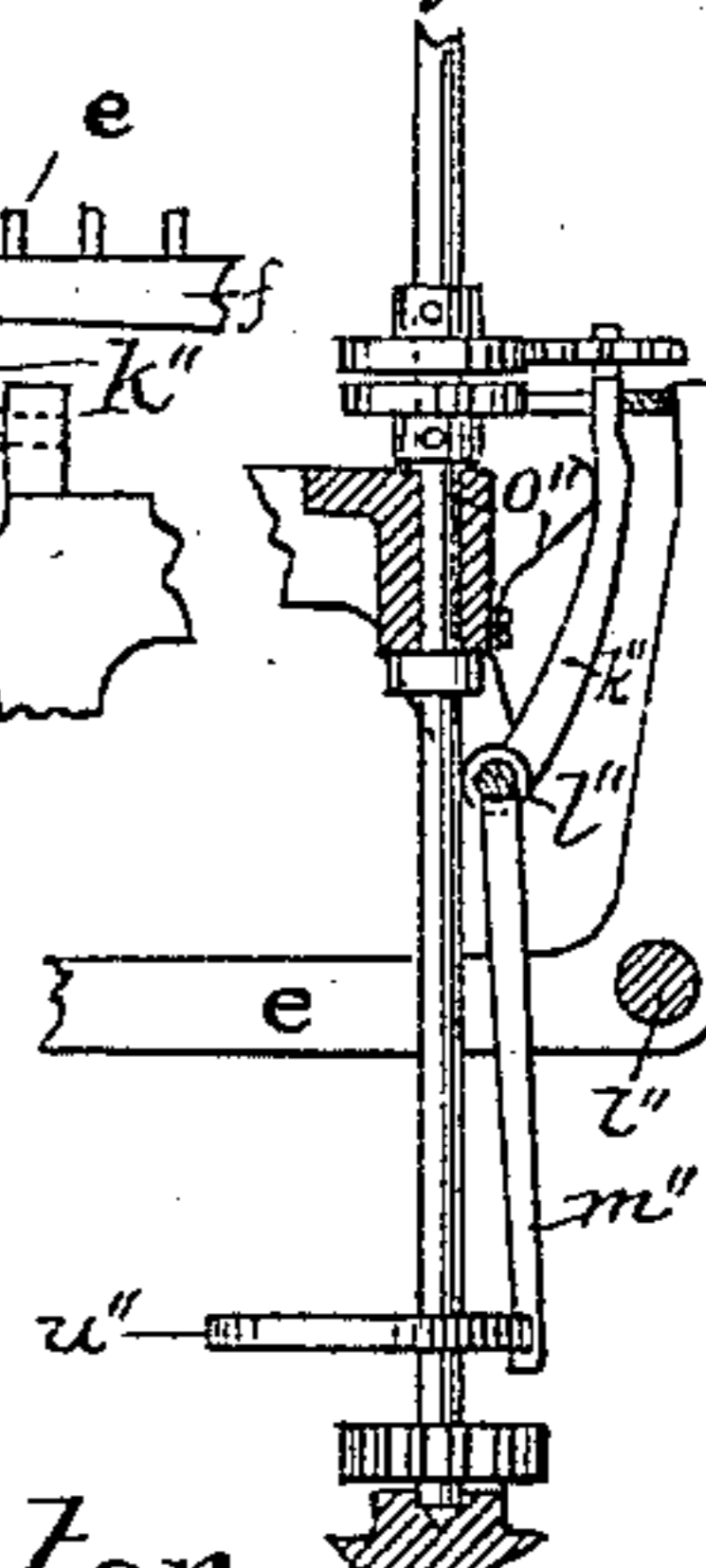


Fig. 7.



Witnesses.

Charles Raettig.
John M. Hill

Inventor.

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UNITED STATES PATENT OFFICE.

BYRON A. BROOKS, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE PHILADELPHIA TYPEWRITER COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 461,865, dated October 27, 1891.

Application filed March 5, 1887. Serial No. 229,758. (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 or science 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 and figures of reference marked thereon, similar letters and figures of reference indicating corresponding parts in all of said drawings.

My invention relates to that class of machines known as "wheel type-writers," and especially to such machines wherein the power employed to revolve said wheel and print the type is derived from the power applied by the operator in depressing the finger-keys; and my invention consists in certain novel parts and combination of parts constituting such an improved machine, and hereinafter fully set forth.

Figure 1 illustrates a side view of my improved machine, partly in section; Fig. 2, a top view of the same; and Figs. 3, 4, 5, 6, and 7 detail parts thereof, Figs. 6 and 7 being, respectively, top and side views of the same device.

Referring to Fig. 1 of the annexed drawings, *b* is a finger-key attached to a key-lever *a*, provided in its lower side with a projection *c*, extending downward, and a tongue *d*. This key-lever is pivoted at *i*², and thence extends upward, as shown in the drawings.

Referring to Fig. 4, *f* and *f'* are arms pivoted at *g* and fashioned at the opposite ends into arcs cut with the gear-teeth *h* and provided with projections *i*. The upper ends *e* of the several key-levers are arranged in a row behind said bars *f* and *f'*, and when the several keys are depressed cause said bars to travel forward. *j* *j'* are wheels, of which a portion of the periphery is cut in gear-teeth, corresponding to the teeth on said bars *f* *f'*, so that as the bar *f* or *f'* is thrown forward the wheels *j* or *j'* are caused to revolve and the shaft *l* turned with either a left-hand or

right-hand revolution. Attached to the shaft *l* is a projection *k*, bent downward at its end and standing between the projections *i* when the bars *f* and *f'* are in the initial position, as illustrated at Fig. 4. The pinion-wheels *j* are attached to shaft *l*, (see Fig. 1,) as is also the rod fashioned into the projection *k*. Instead of employing a single pinion *j*, I prefer to employ two pinions, as clearly illustrated in Fig. 1, both attached to the same shaft and one set above the other, one of said pinions being in gear with the arm *f* and the other with the arm *f'*, and the gear so cut that when one of said arms is thrown forward and in gear with its fellow pinion the gear-teeth on the other arm will stand opposite the uncut periphery of its fellow wheel, and hence be locked against being thrown forward. The shaft *l* is set at its bottom end in an anti-friction socket and is carried through the sleeve *m* to support and steady it. Attached to the shaft *l* near its bottom end is a cog-wheel *n*, meshing into the teeth of a pivoted cog-segment *o*, carrying the rod *p*. The upper end of the shaft *l* passes through the type-wheel *q*, carrying the type *t* in a plurality of rows upon its periphery. The type-wheel fits snugly on the shaft *l*, but is free to move longitudinally thereon. It is caused to move synchronously therewith by means of the cross-tree *r* and pins *s*, which pierce its cap.

u is a cylindrical shell surrounding the type-wheel to protect it from injury. At its rear side it is cut away to expose the types which are brought to the printing-point to the opposing surface of the paper *v* to receive their imprint. Surrounding the shaft *l* and abutting above against the cross-tree *r* and below upon the wheel *q* is a spring *w*, which holds the wheel down upon the anti-friction-roller stop *x*. This stop is carried and its position determined by the pivoted rod *y*, which is operated by the forked rod *z*. The key-levers *a'* and *b'* each have laterally-projecting pins traveling, when said key-levers are depressed, in the path of the flukes in the fork *z*, and, owing to the peculiar form of said flukes (clearly shown in Fig. 1) as one or the other of said key-levers is depressed, elevate the stop *x* to a greater or less extent to bring

either the bottom or the middle rows of types on the type-wheel opposite the printing-point.

At either end of the machine an arm c' is pivoted on a rod e' . By means of the springs f'' these arms are pressed forward and held in the position illustrated in Fig. 1. A rod d' , planed flat on one side, is attached to and extends between said arms on a level with the printing-point on the type-wheel. Against this rod the paper v rests. A bent lever g' , pivoted on the rod i' , extends forward under the key-levers and is attached to a rod h' , which extends the entire width of the machine immediately under all the tongues d^4 on the several key-levers. The tongues d^4 are fashioned, as shown, so as to be readily bent up or down to regulate the throw of the bent lever g' when a key-lever is depressed. At the opposite end of said bent lever a pivoted hood j'' is set, said hood being provided with a spring k' to throw it back against the stop-pin carried by said lever g' . This hood, in combination with the bar 2, forms a trip device. The trip-bar 2 is attached to the carriage and extends the entire length of said carriage, while the bar g' , carrying the tripping-hood j'' , remains stationary.

m' is a rack of ordinary construction, into the teeth of which a fast and loose dog alternately engage in the ordinary manner. These dogs are attached to the vibrating bent lever g' .

p' is a handle for lifting the rack out of connection with the said dogs when it is desired to move the platen to the right or the left without operating any other part of the machine. The platen is fed forward by the spring-drum and cord q' , which will be readily understood without further description.

Attached to the rod h' under the key-levers is a jointed rod r' , which operates the inking-ribbon. A rod u' , attached to said rod r' , is provided with dogs t' , (see Fig. 3,) which make connection with the ratchet-teeth on the wheel s' , attached to one of the inking-ribbon spools. A sliding bar u' carries one of said dogs t' at each end, and as the bar is slid one way or the other one or the other of said dogs is brought in connection with the ratchet-teeth on the wheel attached to one of the inking-ribbon spools. A collar v' is provided to hold the bar in a desired position. This collar is removable, and when it is desired to shift the rock-shaft u' longitudinally this collar is removed. The shaft is then shifted and the collar put in place at the opposite end of the shaft to hold it in its new position.

Attached to one of the paper-feeding rollers w' is a ratchet-wheel x' , into which the dog y' meshes, said dog being provided with a handle z' , by which it is drawn forward to feed the paper and space between the lines. Attached to this same handle is a hooked arm a'' , which, when the handle is drawn forward, raises the rack m' out of connection with the dogs $n' o'$.

The operation of the machine is as follows:

When a key b is depressed, the gear arm or bar f or f' , behind which it stands, is thrown forward, and the stop i is drawn out of the path of revolution of the hook-lock k just before the teeth on the rack h comes in contact with its corresponding tooth-segment attached to the shaft l . The said shaft is thus caused to revolve, and with it the type-wheel, to bring the proper letter to the printing-point. At the same time the projection c on the key-lever has been pressed down into the path of the oscillating arm p , which is attached to the shaft l by cog-gearing, and the parts are so proportioned that the arm p will come in contact with the stop c when the required type is opposite the printing-point, and thus arresting the revolution of the type-wheel at the proper time. The same is true of each of the key-levers b . When the finger-key is released, the spring c'' draws the arm f or f' back until the hook k strikes the projection i on the other bar, when it is locked in position, as shown in Fig. 4.

It is to be here observed that after each type is printed the type-wheel is brought back to an initial position, and that the wheel to print any type on its periphery makes no more than one-half revolution—that is to say, the wheel turns to the right to bring the types on that half to the printing-point and to the left to bring the types on that half to the printing-point. This is true of each of the several rows of type carried by the type-wheel. The types most used occupy the positions nearest to the initial point on either side and increase in distance from said point as they are less frequently used. The key-levers are arranged in the same order, those operating the types nearest the initial point being nearest the central transverse line on the key-board and increasing in distance from said central line as their respective types are farther away from the initial point on the type-wheel. Since the bars f and f' are pivoted at the outside frames of the machine, it will be seen that said bars, when actuated by the depression of the several type-keys, are moved forward a greater or less extent, depending upon the position of the key struck in the key-board, the nearer the key being to said central line the smaller being the arc through which the bars move. Thus the force applied to move the bars f and f' is, by the construction of the machine, regulated so as to exactly bring the desired type to the printing-point. To more accurately insure the accomplishment of this and to prevent the momentum of the type-wheel carrying the type beyond the printing-point, the device $n o p$ is added to the combination already described. In view of the corresponding arrangement of the type upon the type-wheel and the keys upon the key-board, already described, it will be seen that the rod p strikes against the stop c , projected in its path just as the corresponding type reaches the printing-point. If properly adjusted and constructed, the rod p will

strike said stop with scarcely perceptible force, because the type-wheel should be made of some very light although strong material, and hence have little momentum. I prefer to construct it of a shell of gutta-percha.

On the type-wheel one row contains all the small letters, another row the corresponding capitals in similar positions, and hence operated by the same keys, respectively, and the third row figures, punctuation-marks, and other symbols. To print the types in the middle row (that containing the capitals) the key a' is to be depressed before striking the letter-key. To print figures, the key b' is to be first depressed. These keys both operate the stop x by the intervening mechanism $z y$ to raise the type-wheel to the second or third position, where it is then operated by the key b , as before described.

I have described by what means the printing-type is brought to the printing point opposite to and facing the rod d' . I will now explain the manner in which the type is impressed upon the paper.

When one of the key-levers b is depressed, as above described, the tongue d^4 throws the rod h' down and presses the front end of the hood j' against the lower end of the curved bars c' , carrying the platen-rod d' and throwing said rod back from the position illustrated in Fig. 1. This motion continues until the point of the hood j' slips under the lower end of the rod c' or "trips," when the spring f'' throws the platen-rod forward, impressing the paper against the type with a sharp blow. The spring g'' then returns the rod g' to its original position, the hood nodding under the lower end of the rod c' as it returns and assuming its original position under the influence of the spring k' . To insure the sudden and uniform tripping of said hood, I prefer to employ a stop l' , striking against the lower end of the hood as it travels forward, and thus causing it to trip even if it has not pushed the lower end of the rod c' out of its path.

The operation of moving the paper-carriage forward to space between letters may be thus described: A spring-drum q' is attached to the paper-carriage by means of a cord constantly tending to draw the carriage forward. The oscillating motion of the rod h' , caused by depressing a key b , vibrates the fast and loose dogs $n' o'$ through the teeth of the rack m' , attached to said paper-carriage in a manner now well known in the art, and feeds the carriage forward. The feeding of the inking-ribbon is accomplished through the agency of the rod $r' r'$, dogs t' , and ratchet-wheel s' , said rod $r' r'$ being attached to the rod h' , as already described. To space between lines, the operator draws toward him the handle z' , Fig. 5, which, by means of the dog y' , revolves the ratchet-wheel x' , connected to one or both of the paper-feeding rolls w' , which carry the paper forward the required space. At the same time the hook a'' , attached to said handle z' , raises the rack m' out of connection

with its dogs $n' o'$ and permits the paper-carriage to be drawn back to begin a new line.

Figs. 6 and 7 illustrate a modification of the device shown in Fig. 4, dispensing with the hook k and stops $i i$. In these figures the cog-wheels j are not shown. In front of each of the arms f and f' an arm k'' (both attached to a common rock-shaft l'') is placed. The rock-shaft l'' carries a pointer m'' , resting upon an eccentric-disk n'' , against which the spring o'' causes it constantly to bear. When the arm f or f' is thrown forward by the action of the key-levers, the rod k'' is pressed forward, causing the pointer m'' to lift out of the notch on the periphery of the disk n'' at its smallest radius, where it has been resting, and permitting said disk attached to the shaft l to revolve as the printing-type is brought to the printing-point. As the arm f or f' returns to its normal position the pointer m'' is released, falling against the periphery of the disk n'' , which it follows until it drops into the notch before described, thus insuring the return of the type-wheel after each printing action to the normal position and locking it there. It is also to be observed that the pressure of the pointer m'' against the periphery of the eccentric-disk n'' exerts a force independent of the spring c'' to revolve the type-wheel all the way back to its normal position, and that this influence continues, therefore, after the gear-segments h have passed out of connection with the gear-wheels j .

It will of course be understood that my invention is not limited to the precise devices and combinations of devices herein described, illustrated, and claimed, as equivalent devices and combinations may be employed without departing from the spirit of my invention or the scope of the concluding claims.

I do not claim the combination, in a type-writing machine, of the fixed wheel, the ratchet, the transverse bar, the levers, and the type-wheel geared to the shaft.

I do not claim the combination, in a typewriter, of the fixed wheel, the ratchet, the transverse bar, the levers, and the type-wheel geared to the shaft, substantially as shown and described in the patent of John H. Forrest, No. 438,617; nor do I claim the combination of two rows of actuating-keys, two sets of transmitting-lever mechanisms, each operated by the keys of one row, a type-wheel shaft, a type-wheel supported on said shaft, toothed segments oscillated by said lever mechanisms, mutilated pinions on the type-wheel shaft, and radial stop-arms secured to said shaft, said arms engaging stops on the segments, so as to lock the type-wheel shaft in a normal position, substantially as described in the patent of Aloys Wirsching, No. 422,276; nor do I claim the combination, in a type-writing machine, of the pivoted impression-rod frame provided with a notched bar, with a pivoted pawl adapted to engage with said notched bar, means, substantially as de-

scribed, for actuating said pawl, and adjustable stops adapted to cause the disengagement of said pawl from said notched bar, substantially as described and claimed in an application of George B. Webb, as I am not the inventor thereof.

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

10 1. In a type-writing machine, the combination of gear-arms, a type-wheel shaft, a pinion carried by said shaft, said arms being brought independently in gear with said pinion to rotate said type-wheel in either direction from
25 a fixed point and subsequently to return said type-wheel to its initial point, substantially as described.

2. In a type-writing machine, a pinion on the shaft of a type-wheel and a plurality of
20 gear-arms which are out of gear with said pinion when at rest, combined with a device, substantially as described, for holding the type-wheel in its initial position, substantially as described.

25 3. In a type-writing machine, a type-wheel, gear-arms, and a series of key-levers, each lever provided with two projections, one for actuating said type-wheel and the other for arresting its motion, combined with intervening mechanism, substantially as described,
30 for stopping said type-wheel by said arresting projections.

4. In a type-writing machine, key-levers provided with two projections, one for actuating the type-wheel and the other for arresting it, combined with a plurality of gear-arms brought independently in gear with the shaft carrying said type-wheel, and a vibrating arm also in gear with said shaft, substantially as described.
40

5. In a type-writing-machine, the combination of key-levers, a type-wheel shaft, a vibrating arm attached by intermediate gearing to said shaft, and a plurality of gear-arms normally out of gear with a pinion on said shaft, each of said key-levers being provided with two projections, one for operating said gear-arms and one for arresting the motion of said vibrating arm, substantially as described.
45 50

6. In a type-writing machine, a series of key-levers, each provided with two projections, one for actuating the type-wheel and one for arresting its motion, combined with gear-arms and with a vibrating arm attached by intermediate gearing to a pinion on the shaft of said type-wheel, substantially as described.
55

7. In a type-writing machine, the combination of a traveling paper-carriage, a trip-bar attached thereto, and means, substantially as described, for operating said trip-bar. 60

8. In a type-writing machine, a traveling paper-carriage, feed-rolls thereon, a platen-bar pivotally attached to the carriage, means
65 for retracting said bar, and a trip-bar for releasing it, whereby the paper is struck sharply against the printing-type, substantially as described.

9. In a type-writing machine, the combination of a traveling paper-carriage, a bar for striking the paper against the face of the printing-type, a trip-bar attached to the carriage, and means, substantially as described, for operating the same. 75

10. In a type-writing machine, a paper-carriage, a trip-bar, and a bar for pressing the paper against the face of the printing-type, both attached to the paper-carriage, combined with a universal bar extending beneath
80 all the key-levers and connecting mechanism, substantially as described.

11. In a type-writing machine, key-levers, a type-wheel shaft, a mutilated pinion on said shaft, and a plurality of independent gear-
85 arms adapted to engage said pinion singly, each of said key-levers being provided with a projection for operating one of said gear-arms to rotate said type-wheel shaft, the mutilated portion of said pinion at such time
90 being opposite to and out of engagement with the other gear-arm, substantially as described.

12. In a type-writing machine, the combination of paper-feed rolls, a traveling trip-bar attached to the paper-carriage, and a stationary tripping device operating said trip-bar, substantially as described. 95

13. In a type-writing machine, the combination of a trip-hood and a spacing-dog, both connected to and operated by a vibrating bar
100 extending beneath all the key-levers, substantially as described.

14. In a type-writing machine, key-levers, a type-wheel shaft, a vibrating arm attached by intermediate gearing to said shaft, and a
105 plurality of gear-arms normally out of gear with a pinion on said shaft, each of said key-levers being provided with two projections, one for operating said gear-arms and one for arresting the motion of said vibrating arm,
110 combined with locking mechanism, substantially as described.

BYRON A. BROOKS.

Witnesses:

J. EDGAR BULL,
ROBERT BARTLETT.