T. L. DENNIS.

TYPE WRITER SPACING MECHANISM.

APPLICATION FILED MAR. 23, 1914.

1,181,855.

Patented May 2, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

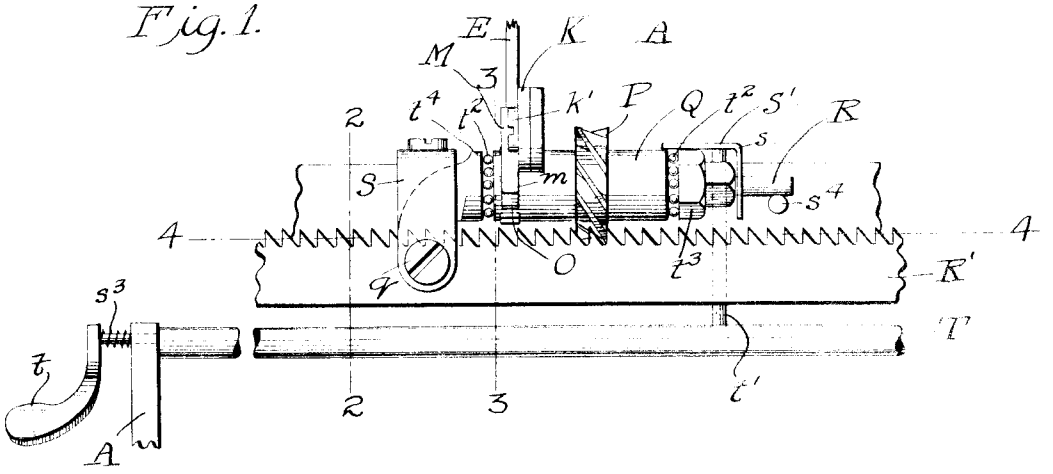


Fig. 2.

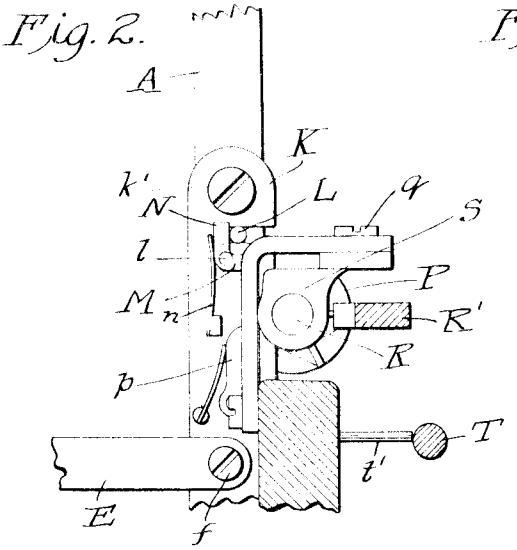
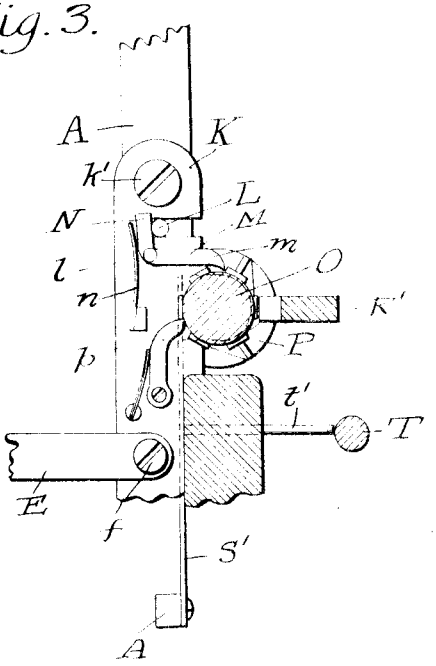


Fig. 3.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 4.

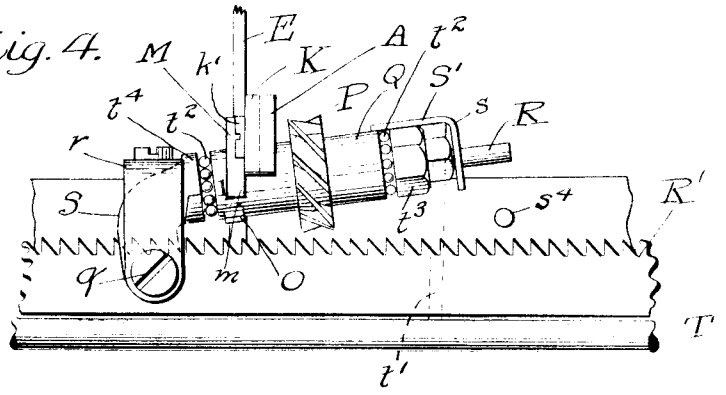


Fig. 5.

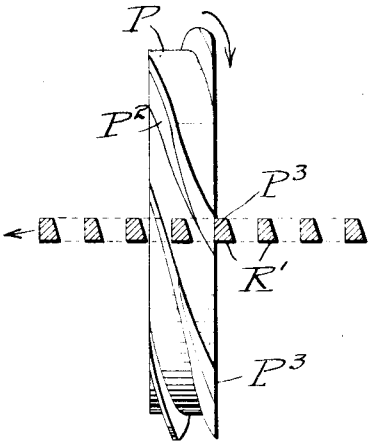
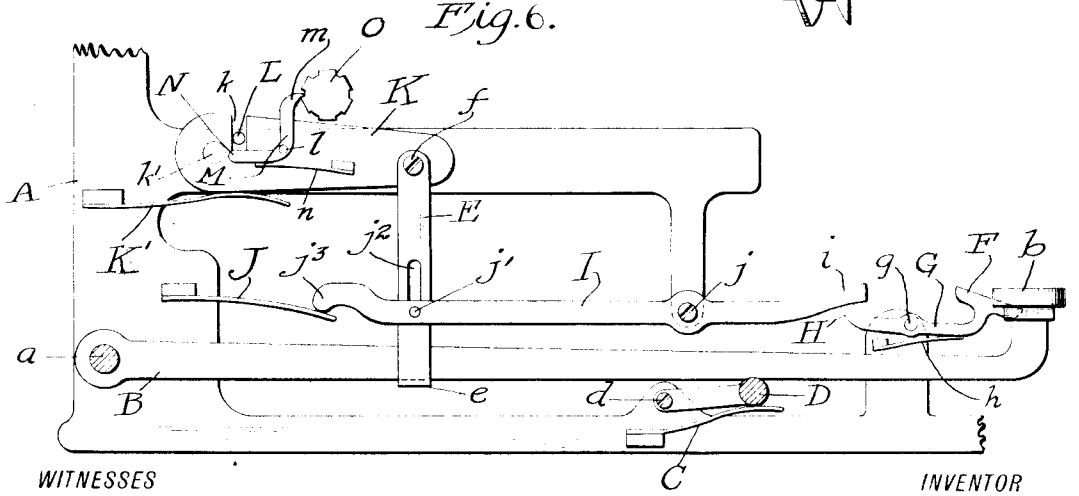


Fig. 6.



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TYPE-WRITER SPACING MECHANISM.

1,181,855. Specification of Letters Patent. Patented May 2, 1916.

Application filed March 23, 1911. Serial No. 616,396.

To all whom it may concern:

Be it known that I, THOMAS L. DENNIS, a citizen of the United States, residing in the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Type-Writer Spacing Mechanism, of which the following is a specification.

My invention in typewriter spacing mechanism relates to a rotatory escapement device co-acting with an escapement-toothed rack and it also has reference in this connection to mechanism for releasing the rotatory escapement device to afford the shifting of the carriage with facility and the object of my invention is to provide a typewriter spacing mechanism which presents more durability in construction, more accuracy in its operation and greater fidelity in the performance of its work than those in vogue and previous to my invention in so far as I am at present aware.

Another object of the invention is to provide in a mechanism of the character to which my invention relates, a minimum of friction in the operation of the co-acting parts to effect the escapement movement of the carriage co-acting therewith and thus accomplish the escapement movement with a minimum of re-action due to the touch of the operator.

The chief features characteristic of my invention whereby I attain the aforesaid objects thereof lie in the construction as disclosed by the drawings and detailed descriptive matter relative thereto hereto attached which together forms part of this specification.

With reference to the drawings, Figure 1 is an enlarged top plan detailed view of the escapement mechanism and co-acting parts. Fig. 2 is a cross sectional view taken on the line 2—2 of Fig. 1. Fig. 3 is a similar view taken on the line 3—3 of Fig. 1. Fig. 4 is a similar view to that illustrated in Fig. 1 showing the rotatory escapement mechanism thrown out of gear with the engaging rack. Fig. 5, is an enlarged detailed view of the rotatory ratchet wheel and an enlarged sectional view taken through the teeth of the rack on a line 4—4 of Fig. 1. Fig. 6 is a side elevational view of a portion of a typewriting machine carrying my improved spacing mechanism illustrating the co-acting type and spacing keys and the manner by which the movement is communicated to the rotatory spacing mechanism.

In the several figures similar characters of reference are employed to designate like parts where they occur, wherein—

A depicts the lower portion of the side frame of a typewriting machine embodying my invention which carries a bearing pin *a* upon which one extremity of a type key lever B is pivoted. At the opposite extremity of the type key lever B is the type key *b*. The type key lever B is thrust upwardly by a leaf spring C secured to the side frame A which in turn bears against a rocker D pivoted to the frame A at *d*. The type key lever B is adapted upon the downward depression thereof by the key *b* to engage a pull lever E by a lug *e* at the lower terminal thereof which is bent to project under the lower edge of the said type key lever B, while the upper terminal of the pull lever E is pivoted directly to the spacing mechanism at *f*.

F designates the spacing key which is mounted on one extremity of a lever G pivoted at *g* to the side frame A of the typewriting machine. The lever together with the key is thrust upwardly at the key extremity by a leaf spring *h* and when the key F is depressed by the operator the opposite extremity H of the spacing lever G impinges against the outer terminal *i* of the escapement lever I. This latter is pivoted at *j* to the side frame A of the typewriting machine and is provided with a stud *j'* which freely engages a slot j^2 in the pull lever E. The inner terminal j^3 of the escapement lever I is thrust upwardly by a leaf spring J secured to and carried by the side frame A of the typewriting machine and the arrangement of the several parts co-acting with the escapement lever I are such as to impart a downward movement to the pull lever E upon the depression of the spacing key F by the operator, but it will be observed that upon a downward movement being given to the type key lever B the pull lever E will be actuated in a similar manner, but without further disturbing the position of the spacing lever I. This feature is afforded by virtue of the slot j^2 in the pull lever E, which affords sufficient play for the stud *j'* when the pull lever E is being moved downwardly. To the frame A of the typewriting machine is pivoted at *k'* a rocker K, which is spring pressed upwardly by a leaf spring K' se-

cured to the framework A of the machine, the said rocker being illustrated more in detail in Figs. 1, 2, 3 and 4. The rocker K is slotted at *k* to freely engage a stud L secured to the typewriter frame A.

A bell cranked form of pawl M is pivoted at *l* to the rocker K; one terminal of the said bell crank lever is formed as a pawl *m* to engage a ratchet wheel O and the opposite extremity N of the said lever is adapted to engage the stud L when the rocker K is thrust upwardly to a sufficient extent. The pawl M is pressed against the ratchet wheel O by a leaf spring *n* secured to the rocker K. The ratchet wheel O is made integral with an escapement wheel P by virtue of and through a hub Q upon which these two members are formed and the whole is mounted on a shaft or spindle R for free rotation. This latter member is secured to and carried by a bracket S which latter is pivoted at *q* to an angle bracket *r* secured to the frame A of the machine.

R′ depicts the toothed rack which engages the escapement wheel P. The spindle R is pressed toward the toothed rack R′ by a leaf spring S′ which impinges against the spindle R by forwardly bent portion *s* which is perforated to engage the spindle R and the opposite extremity of the spring S′ extends vertically downward where it is pivotally secured to the frame A of the typewriting machine.

An eccentric shaft T pivoted to rotate in the framework A of the typewriting machine is actuated by a thumb lever *t* rigidly secured to the said eccentric shaft T. This latter engages a pitman *t′* which impinges against the leaf spring S′ and upon the rotation of the eccentric shaft T by the thumb lever *t* the pitman *t′* will depress the leaf spring S′, and by virtue of the lug *s* embracing the spindle R the latter will be swung on the pivot *q* into a position as illustrated in Fig. 4.

The hub Q is provided with thrust bearings t^2 at each extremity which are maintained in contact with the terminals of the hub Q by a nut t^3 secured to the spindle R and shoulder t^4 of the bracket S. A spring pressed counter pawl *p* is pivoted to the framework A of the machine and is adapted to engage the ratchet wheel O and check the back movement of the said ratchet wheel, while the pawl M is in action.

The function of the various parts just described and their relation to each other are as follows:—To effect the operation of my improved spacing mechanism through the medium of the escapement wheel P which is the fundamental element of my invention, it will be observed that by the depression of a type key as *b*, the type lever B will be swung on its pivotal connection *a* aforesaid, until the underside of the said lever impinges against the lug *e* of the pull lever E whereupon the rocker K will be pulled downwardly by virtue of its pivotal connection *f* with the pull lever E, and the pawl M will be carried down with it sufficiently for the toothed end *m* thereof to engage a tooth of the ratchet wheel O. In the meanwhile, the ratchet wheel O will be held in check against the drag of the said pawl by the engagement of the counter pawl *p* therewith and upon the release of the type key *b* by the operator, the rocker spring K′ will swing the rocker K upon its pivot *k′* and carry the pawl M engaging the ratchet wheel O with it sufficiently to rotate the ratchet wheel O for a proportion of its circumference equal to one tooth thereof whereupon the stud L carried by the framework will engage the terminal N of the pawl M and throw the latter out of gear with the ratchet wheel O. The effect that the rotation of the ratchet wheel O will have upon the escapement wheel P which revolves therewith will be more clearly illustrated by reference to Figs. 5 and 6 wherein it will be observed the ratchet teeth R′ are beveled to coincide with the teeth of the escapement wheel P. These latter teeth are designated P^2.

With reference to Fig. 5, let it be assumed that the carriage of the machine to which the ratchet teeth R′ are fixed, is carried transversely during the operation of the keys, as is customary in the majority of typewriters, to which my invention relates, and is drawn by a spring (not shown) in the direction of the arrow which tends to move the ratchet teeth R′ from right to left after the operator has pushed the carriage back to its starting position, which has the effect, as well known, of energizing the carriage spring to affect the spacing, when the machine is in operation. Upon freeing the ratchet teeth and connecting carriage from further movement, the action of the spring drawn carriage will be to thrust the vertical face of a tooth R′ against the flat surface of an escapement tooth P^3 as shown in said Fig. 5. Upon the depression of any of the keys *b* or the spacing key F the rotation of the ratchet wheel P will be effected through the pawl M in the manner already described, and only sufficient movement on the part of the said ratchet wheel in the direction of the indicating arrow to move the flat surface portion of the escapement tooth P^3 away from the vertical face of the escapement tooth R′, when the spring drawn ratchet teeth R′ will thrust the engaged tooth in contact with the inclined surface portion of the escapement tooth, whereupon the said ratchet wheel will be rotated by said tooth R′, until the vertical face of the next ratchet tooth will engage the flat surface of the next escapement tooth and arrest fur-

ther movement of the carriage thus providing the required spacing.

By the manipulation of the thumb lever *t* and the rotation of the eccentric shaft T as previously described, the escapement wheel P may be thrown completely out of engagement with the ratchet teeth R′ and the connected carriage of the typewriting machine may be brought into any desired position between its limits of movement without having to set the escapement wheel P into rotation. It will be understood that this will be a matter of considerable convenience for back spacing and upon the release of the thumb lever *t*, a torsional spiral spring s^6 will return the eccentric shaft T and thumb lever *t* to its normal position. In the normal position of the spindle R and my improved escapement mechanism carried thereby, a proper register of the escapement teeth P^2 with the ratchet teeth R′ is effected by the thrusting of the spindle R against a stop s^4 by the leaf spring S′.

It will be observed by the foregoing description of the different parts of my improved spacing mechanism and the operation thereof that the rotatory escapement wheel P affords certain features in efficiency of operation and durability characteristic of a rotatory mechanism and not found in the usual form of reciprocating devices to accomplish a similar purpose, and

I claim as new and desire to secure by Letters Patent of the United States—

1. In mechanism of the character described, the combination of a toothed rack, and an escapement wheel having inclined teeth provided with a flat surface portion, said teeth of each being adapted to mutually engage and interlock and release each other upon the rotation of the wheel, and the rack being adapted to drive the wheel when said wheel is moved out of contact with the flat surface portion of each tooth.

2. An escapement mechanism of the character described comprising, a rack having teeth with inclined and vertical abutment faces, and an escapement wheel provided with substantially spiral teeth having an inclined surface and a flat surface portion, the vertical face of the rack tooth being adapted to contact with the flat surface of the wheel tooth, whereby upon an initial rotation being given to the wheel, the vertical face of the rack tooth will be brought into engagement with the inclined surface of the wheel tooth and the wheel will be set into rotation thereby.

3. In a spacing mechanism of the character described, an escapement comprising a rack having teeth with inclined and vertical faces, a rotatory hub having an integral ratchet wheel and an integral escapement wheel, a spindle for supporting said hub, a bracket carrying said spindle pivoted to the frame of the machine, and means for imparting rotatory motion to said hub.

4. In a spacing mechanism of the character described, an escapement comprising a rack having teeth provided with vertical and beveled faces, a toothed escapement wheel engaging said rack, the teeth of said wheel being provided with beveled surfaces and a flat surface portion, the rack and wheel being mutually engaged whereby upon an initial rotation being imparted to the wheel, the corresponding teeth of the rack and escapement wheel will be brought into engagement and the escapement wheel will be set into rotation thereby.

5. In mechanism of the character described, an escapement device comprising a rack having teeth with inclined and vertical faces, a rotatory hub having a ratchet wheel and an escapement wheel, said escapement wheel being provided with substantially spiral teeth having beveled surfaces and a flat surface portion, a spindle for supporting said hub, a bracket carrying said spindle pivoted to the frame of the machine, and means for imparting rotatory motion to said hub.

6. In mechanism of the character described, an escapement device comprising a toothed rack and a toothed ratchet wheel engaging therewith, a pawl and ratchet mechanism coacting with the wheel and adapted to impart a partial movement to said wheel, and the rack adapted to impart a further movement to the wheel, means for disengaging the wheel from the rack, means for engaging the wheel with the rack, and means for disengaging the pawl from the ratchet mechanism.

7. In a spacing mechanism of the character described, a toothed rack and a toothed wheel provided with engaging teeth, a pawl and ratchet mechanism coacting with the wheel and adapted to impart a partial movement thereto, and a final movement being imparted to the said wheel by the rack, the two mutually coacting to arrest the movement of the rack, and an eccentric mechanism for disengaging the wheel from the rack, substantially as described.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS L. DENNIS.

Witnesses:
M. S. CUMNER,
JAS. ISAACS.