

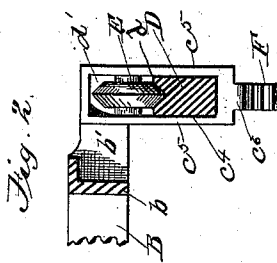
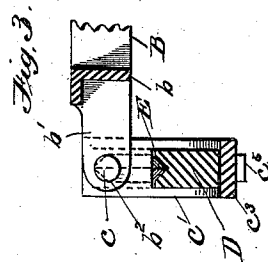
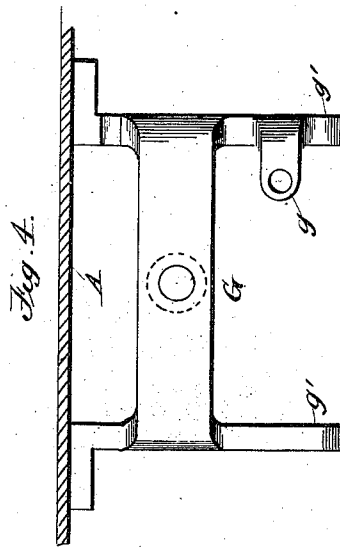
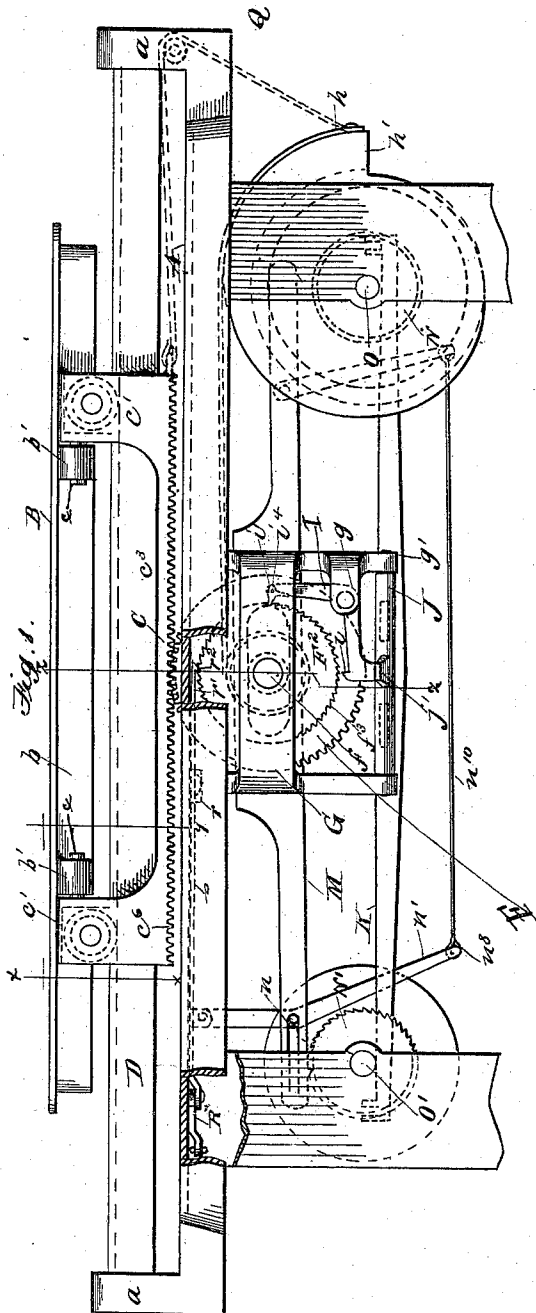
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4 Sheets—Sheet 1.

J. A. WHITCOMB.
TYPE WRITING MACHINE.

No. 309,272.

Patented Dec. 16, 1884.



Attest:
W. H. Knight
Bernhard,

Inventor:
J. A. Whitcomb.
per Edison & Prot.
Attorneys

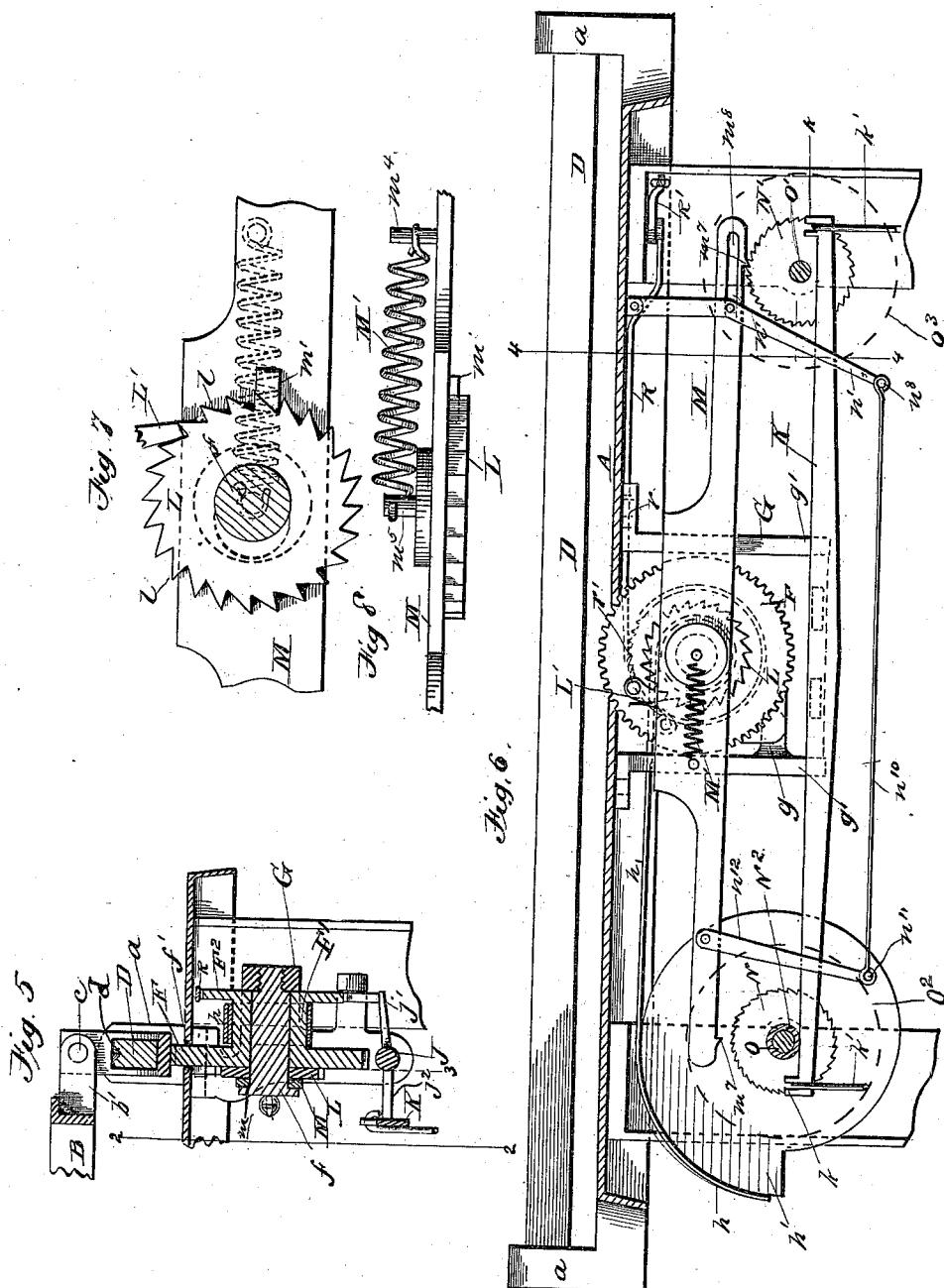
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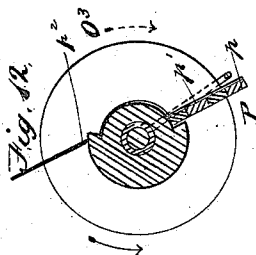
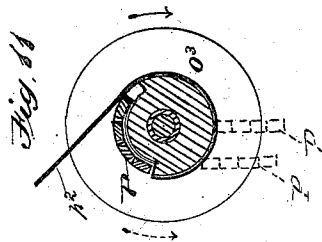
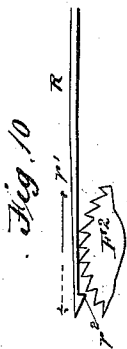
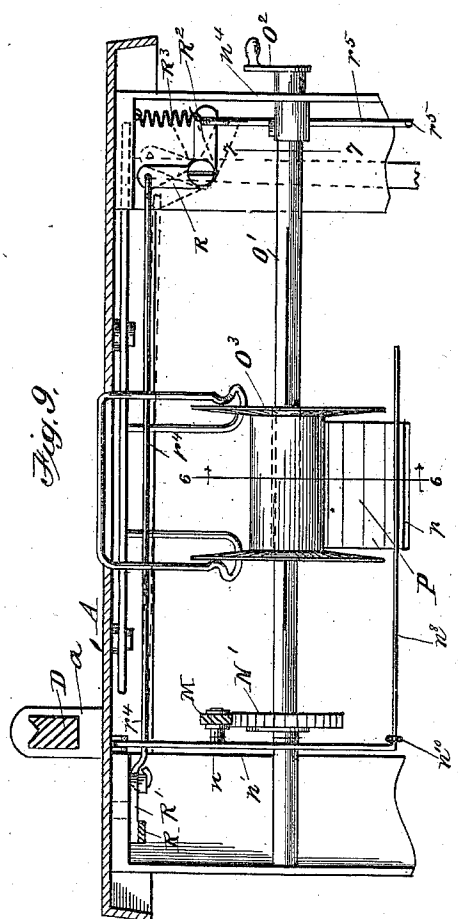
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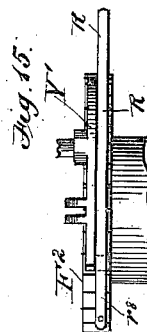
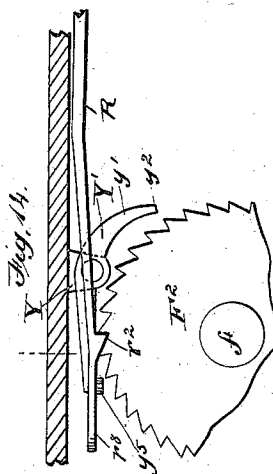
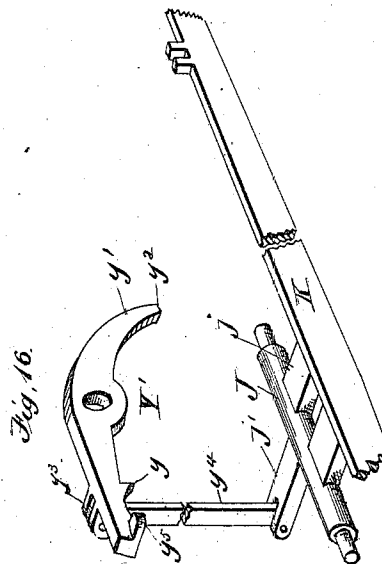
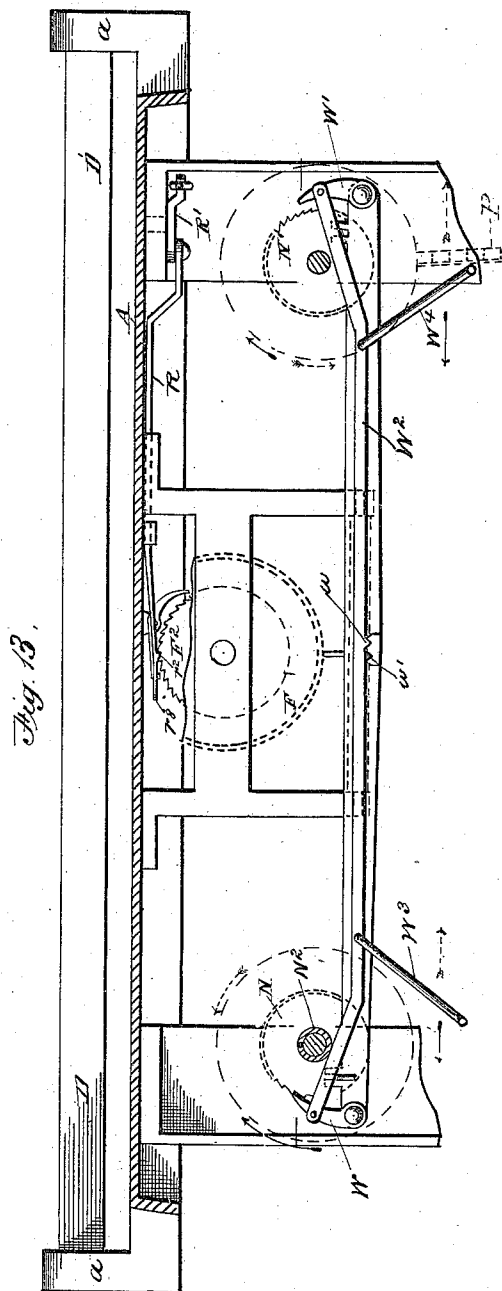
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4 Sheets—Sheet 4.

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Inventor:
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per Edson Bros.
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UNITED STATES PATENT OFFICE.

JAMES A. WHITCOMB, OF WASHINGTON, DISTRICT OF COLUMBIA.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 309,272, dated December 16, 1884.

Application filed February 25, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. WHITCOMB, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Type-Writers; and I do hereby declare the following to be a full, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to that class of type-writers wherein the successive depression and release of a series of key-levers operates to vibrate and throw a series of type-characters upward and against the surface of the paper placed upon a suitable platen mounted upon a horizontally and laterally moving carriage; and the novelty consists in the construction, arrangement, and adaptation of parts, as will be more fully hereinafter set forth, and specifically pointed out in the claims.

The invention more particularly contemplates certain new and useful improvements in the class of type-writers above referred to, whereby the laterally-moving carriage may be moved either forward or backward at the will of the operator, such forward or backward movement taking place in the usual step-by-step manner.

The invention further contemplates certain new and useful improvements in the means employed to operate or rotate the ribbon-holding spools, whereby the inking-ribbon shall be moved from side to side of the machine below the platen in alternate opposite directions.

The invention further contemplates the provision of means whereby the movement of the ribbon-carrying spools may be automatically reversed when the ribbon is unwound from one or the other of the spools.

To these ends the invention consists, essentially, in the mechanisms and combinations of mechanisms fully illustrated in the accompanying drawings, which form a part of this specification, and are hereinafter claimed.

Figure 1 represents a rear view of the upper portion of a type-writer provided with my improvements. Fig. 2 represents a cross-sectional view taken on the line *x x* of Fig. 1,

showing the rollers that support the rear side of the carriage in position upon the carriage guide-rail. Fig. 3 represents a similar cross-sectional view taken on the line *y y* through the carriage guide-rail, showing the manner of hinging the carriage at its rear side to its carriers and supports. Fig. 4 represents a rear elevation of the hanger that supports the carriage-actuating wheel. Fig. 5 is a view taken on the line *z z* through the rear rail of the carriage, its guide-rail and actuating-wheel, and the means that operates said carriage-actuating wheel. Fig. 6 represents a longitudinal section taken through the rear portion of my type-writer, on the line 2 2 of Fig. 5, and looking toward the rear of the machine. Fig. 7 represents a portion of the ribbon-spool-operating bar, showing the means employed to give motion to said bar, the view being taken on the line 3 3 of Fig. 5, and enlarged to clearly show details of construction. Fig. 8 represents a top plan view of the parts shown in Fig. 7. Fig. 9 represents a sectional view, taken from front to rear, of my type-writer, on the line 4 4 of Fig. 6, said view showing one of the ribbon-carrying spools and one method of making said spools self-reversing. Fig. 10 represents a portion of the pallet-wheel attached to the carriage-actuating wheel, and shows a device for setting the carriage backward in connection with said pallet-wheel. Figs. 11 and 12 represent sectional views taken through one of the spools, and show the means employed to automatically reverse the motion of said spools when winding or unwinding the ribbon. Fig. 13 represents a longitudinal section through the top of the machine, showing one method of making the ribbon-carrying spools self-reversing. Fig. 14 is a front elevation of a portion of a pallet-wheel attached to the carriage-actuating wheel, and shows the means for moving said carriage in forward and backward direction combined together. Fig. 15 is a top plan view of the parts shown in Fig. 16. Fig. 16 is a perspective view of the forward-moving mechanism of the carriage, said mechanism shown detached from the machine.

Similar letters of reference in the several figures denote similar parts.

Referring to the drawings, A designates the top of a type-writer of the ordinary construc-

tion, having the ordinary central opening in which operate the pendent type-carrying arms.

5 *a* designates lugs projecting upwardly from each side of the top A, near the rear edge thereof.

B designates the paper-carriage, placed above and adapted to move from side to side of the top A, in the usual manner. The rear rail, *b*, of the carriage B is provided with projecting lugs *b'*, having apertures *b''*, through which apertures pass studs or pivotal pins *c*, projecting laterally from the enlarged ends *c'* of a longitudinally-moving rack-bar, C.

15 D designates the guide-bar upon which the carriage moves, and it is preferably of rectangular form in cross-section, having its bearings at each end rigid in lugs *a*, formed upon the top A. The upper edge of this guide-bar 20 D is provided with a V-shaped groove, *d*, extending from end to end.

E designates small rollers mounted within recesses *d'*, formed in each of the enlarged ends *c'* of the rack-bar C. The periphery of 25 each of the rollers E is V-shaped in cross-section to correspond with the grooves *d*, as shown in Fig. 2, said V-shaped periphery of the rollers moving in and kept by the groove *d* of the bar from irregular movement. The 30 forward edge of the carriage is provided with the usual steadying-roll. The body proper, *c''*, of the rack-bar C is below the guide-bar D, its ends *c* extending upward and provided with mortises *c''*, which embrace the bar D. 35 (See Figs. 1, 2, and 3.) The side walls, *c''*, of the mortises *c''* press lightly against the sides of the bar D, thus preventing lateral movement of said rack-bar when the machine is in operation. In the side walls, *c''*, of the ends 40 *c'* are journaled the rollers E. The lower surface of the bar C is provided with rack-teeth *e''*, said rack-teeth extending from end to end of the bar C, as shown in Fig. 1.

F represents a gear-wheel mounted upon a 45 stud; *f*, projecting from a hanger, G, secured to the lower surface of the top of the machine, at the rear edge thereof. The spur-wheel F projects through an aperture, *f'*, in the top A, its teeth *f''* engaging with the teeth *c''* of the 50 rack-bar C. The rear side of the spur-wheel F is provided with a boss, *F'*, the outer surface of which is concentric with the periphery of the wheel F. To the boss *F'* is secured one end of a strap, *h*, the opposite end of which 55 strap is secured to the shell *h'*, inclosing the spring that furnishes motive power to the carriage in its forward movement. To the outer rear end of the boss *F'* is secured a ratchet-wheel, *F''*, the teeth *f''* of which are alternately 60 engaged by teeth *i''*, which form opposite ends of a double pawl or pallet in the manner of an escapement. The tooth or engaging portion *i''* of this pallet is pivoted to the end of the vertical arm thereof by a pin, *i''*, as shown in 65 Fig. 1, thus providing for the backward movement of the wheel *F''* when it is necessary to set back the carriage. The pallet I is pivoted

to a projecting portion, *g*, of the hanger G, and said pallet is operated by an arm, *j'*, extending rearwardly from a rock-shaft, J, journaled in arms *g'* of the hanger G. The opposite 70 side of the rock-shaft J has a projecting arm, *J''*, to the outer ends of which is secured a bar, K, that extends across the machine from side to side thereof, and is provided at 75 its ends with upwardly-projecting spurs *k*, between which, upon the bar, is hooked the ends of rods *k'*, that pass downward and are attached to a bar that passes from side to side of the machine below the key-levers thereof. 80 The bar K and connecting-rods *k'* are similar to those in common use in machines of this class, and operate herein in a similar manner.

The parts thus far described relate to the paper-carrying carriage and its connections. 85 I will now proceed to describe the manner in which the ribbon-carrying spools are operated.

L designates a ratchet-wheel mounted loosely upon the stud *f*, outside of and bearing 90 against the face of the spur-wheel F, and its teeth *l* are engaged by the pawl *L'*, pivoted to the face of the wheel F, as shown in Fig. 6, said pawl *L'* operating to lock the ratchet-wheel against backward movement, and also 95 to cause said ratchet-wheel to move forward with the spur-wheel.

M designates a movable bar, provided at or near its central portion with an aperture, *m*, through which its stud *f* passes, and when said 100 bar M is in proper position upon said stud the bar M lies against the outer face of the ratchet-wheel L. The bar M is provided upon its inner face with a projecting pin or tooth, *m'*, that engages with the teeth *l* of the ratchet-wheel L when the latter is rotated, and by 105 which the bar is moved longitudinally, the aperture *m* in the bar M being elongated to admit of such longitudinal movement.

M' represents a spring attached at one end to a pin, *m''*, extending from the bar M, and its 110 opposite end to a pin, *m'''*, projecting from the end of the stud *f*. It will be seen that the bar M is forced in one direction longitudinally by the teeth *l* of the ratchet-wheel L acting upon the pin *m'*, and is forced in an opposite direction 115 by the spring M'. The bar M is provided near each end, upon the lower side thereof, with projecting teeth *m''*, that engage with and rotate ratchet-wheels N N', secured to the shaft O' and sleeve N'' upon the shaft O, 120 respectively. The shafts O O' extend from front to rear of the machine, and are journaled at each end in the legs thereof, as shown. The ribbon-holding spools O'' O''' are mounted upon the shaft O' and sleeve N'', respectively, and 125 slide freely thereon, but are held against rotation independent of the shaft O' and sleeve N'' by pins that project from said spools into slots *o*, formed in said shaft O' and sleeve N''. The bar M is adapted to be tilted in order to bring 130 one or the other of its teeth *m''* into engagement with one or the other of the ratchet-wheels N N', such tilting being effected in the manner and by the means which I will now

describe, to wit: One end of the bar M is provided with a slot, m^8 , into which projects an arm, n , projecting from a swinging bar, n' , pivoted at its upper end to the bottom surface of the top plate, as shown. When the lower end of the bar n' is moved back or forth by means hereinafter described, the arm n of said bar moves back and forth in the slot m^8 of the bar M, and causes the end of the bar containing the slot to be raised or lowered, and thus brings the teeth m^7 upon the opposite ends of the bar M into engagement with one or the other of the ratchet-wheels N N'. The forward end of the shaft O' is provided with a crank or handle, O', whereby the spool O³ is rotated for the purpose of winding the inking-ribbon thereon. The shaft O at the opposite side of the machine is provided upon its rear end with the usual coiled spring for actuating the carriage-moving wheel F, said spring being secured at one end to the shaft O and at its opposite end to the case H, hereinbefore referred to. The shaft is controlled by the usual ratchet-wheel and pawl common to machines of this class. In the present case said ratchet-wheel and pawl is located upon the forward end of the shaft in front of the machine, as shown by dotted lines in Fig. 1, instead of being, as heretofore, placed at the rear of the machine. By this construction I am enabled to increase or lessen the tension of the actuating or motive spring while seated before the machine.

I provide for the automatic reversal of the ribbon-spools by the means which I will now describe.

P designates a flap composed of a series of slats, p , arranged parallel with each other, and secured together by a flexible backing, p' , one edge of which is secured to the body of the spools, between the end flanges thereof, as shown in Figs. 11 and 12, in which figures p^2 represents the ribbon.

Fig. 11 represents the spool O³ as turning backward or unwinding the ribbon thereon. The figure shows by full lines the flap P lying snugly within a recess formed in the body of the spools in the position it occupies while the spool is full or being filled. The continued backward rotation of the spool causes the flap to successively assume the positions indicated by dotted lines in Fig. 11 and by full lines in Fig. 12. By reference to the latter figure it will be observed the backing p' of the flap is upon the upper side of the said flap, and that therefore, because of its described construction, said flap will remain extended and operate to press or bear against any obstruction presented to its upward passage.

n^8 designates a rod projecting from the lower end of the swinging bar n' , and passing below the spool O³ in the plane of the shaft O' and in the track of the flap P, which strikes against said rod when the spool O³ is being unwound, pressing it outward and in the position shown in Fig. 6, thus drawing the end of the bar M, containing the slot m^8 , downward, and the tooth m^7 upon the lower edge of said end into engage-

ment with the ratchet-wheel attached to the spool O³, as shown in said figure. The rod n^8 is connected by a rod, n^{10} , with a rod, n^{11} , projecting from the lower end of a swinging arm, n^{12} , the upper end of which is pivoted to the bar M, as shown. The rod n^{11} projects below the spool O² in the track of the flap P thereon in a manner similar to the rod n^8 , hereinbefore described. When the spool O² is unwound, the flap P thereon strikes against the rod n^{11} , pushing it outward, and thus, through rod n^{10} and swinging arm n' , causing the end of the bar M containing the slot m^8 to be raised and the tooth m^7 upon the opposite end of the bar M, above the spool O², to be thrown into engagement with the ratchet-wheel N' connected to said spool O².

From the foregoing description it will be seen that the movement of the spools O² O³ will be automatically reversed by the mechanism above described.

I will now describe the means for giving the back-set to the carriage—an action frequently rendered necessary in the operation of this class of machines.

R designates a sliding rod, supported by suitable hangers, r , and having its outer free end bent or inclined downward, as shown at r' . It is provided upon its lower surface with a tooth, r^2 , that normally rests above the ratchet-wheel F², attached to the carriage-actuating wheel F. The tooth r^2 is, when the machine is at rest, slightly in advance of the teeth upon said wheel F². (See Fig. 10.) From the end r' the rod R extends backward to a bell-crank lever, R', pivoted to the lower surface of the top A, near the rear side edge thereof. The lever R' is connected by a rod, r^4 , with a similar bell-crank lever, R², pivoted to the inner side surface of one of the forward legs, and said bell-crank lever R² is in turn connected by a wire, r^5 , with one or more of the operating-keys of the machine. (Not shown.) The back-set mechanism is operated in order to set back the carriage step by step, and as soon as the said carriage has been set back to the distance desired a spring, R³, returns the lever R² to its normal position, to throw the rod R forward into the position shown in Fig. 10. In said figure the full-line arrows show the direction of the rod R when drawing the ratchet-wheel F² backward, and the dotted-line arrows show the direction of the rod when the same is returned to its normal position by the spring R³. I preferably make or form seventy (70) teeth upon the lower surface of the rack-bar C and an equal number upon the spur-wheel F and ratchet-wheel F², whereby a corresponding number of letters may be printed in a continuous line. It will be observed that the bearings or points at which the carriage is pivoted to the rack-bar C are upon the inner faces of the enlarged ends c' of said bar, and also that said pivot is of the simplest possible description. By making the pivot in the manner shown I economize space. By using the ratchet-wheel F² as a regulator or governor of

the forward motion of the paper-carriage, and attaching the strap *h* to a drum secured to the side of said ratchet-wheel, I am enabled to produce a more even and regular motion of the carriage, and at the same time to relieve it from direct strains, which other machines have in which the strap is connected directly to the carriage. If desired, however, the spring-actuated drum may be connected directly to the carriage by a strap, as shown by dotted lines at *Q* in Fig. 1.

The operation of my improvement is as follows: The keys, similar to those in ordinary use and operating in similar manner, being pressed downward, the type are forced upward against the platen. At the same time the bar *K* is drawn downward, and, through the rock-shaft *J*, an arm, *j'*, operates to raise the lower arm, *i*, of the pallet *I*, and forcing its tooth into engagement with the ratchet-wheel *F*², the opposite upper tooth, *i'*, upon the upper arm of said pallet being simultaneously thrown out of engagement with the said ratchet-wheel. Upon the release of the keys the bar *K* rises and rotates the rock-shaft *J* in the opposite direction, causing the arm *j'* to fall, the pallet-arm *i* to be thrown out of engagement with the wheel *F*², and the opposite upper tooth, *i'*, to become engaged. By this action the wheel *F*², under strain by the strap *h* from the actuating spring-shell *h'*, is allowed to move forward a distance corresponding to length of one of the teeth of said wheel *F*². The spur-wheel *F*, being connected to said ratchet-wheel and moving therewith, operates to move the rack-bar *C* forward the distance of one tooth.

The ribbon-spools, receiving motion through the bar *M*, are operated simultaneously with the carriage, as follows: The rotation of the spur-wheel causes the ratchet-wheel *L* upon its face to move forward a corresponding distance with such spur-wheel, and thus moves the bar *M* through the ratchet-teeth *l* of the ratchet-wheel *L* and the fixed tooth *m'* upon said bar forward a distance corresponding with the depth of one tooth. When the teeth *l* of the ratchet-wheel *L* pass the teeth *m'* of the bar *M*, said bar is drawn backward to its normal position by the action of the spring *M'*. Thus every tooth of the ratchet-wheel *L*, as it passes the tooth *m'* of the bar, operates to give a back-and-forth movement to the bar *M*. When it is desired to set the carriage backward, the key or keys attached to the rod *R*, hereinbefore described, are operated, the tooth *r*² upon said rod engaging with the teeth of the ratchet-wheel *F*² and drawing said wheel backward, at which time the pallet *I* serves as a pawl to hold the ratchet-wheel *F*² against forward movement. The rod *R* may be, by proper keys, drawn backward a distance corresponding to two or more of the teeth upon the wheel *F*², and thereby, as will be readily seen, set the carriage backward either a distance equal to a single forward movement or space, as determined by the pallet *I*, or the distance

of two or more of such forward movements. If desired, the bar *M* may be dispensed with, the ribbon-spools being moved in lieu thereof by the following means, to wit: *W W'*, Fig. 13, designate pawls pivoted at one end to the outer ends of the bar *K*. The upper free ends of the pawls *W W'* engage with and rotate the ratchet-wheels *N N'* upon the sleeve *N*² and shaft *O'*, to which the ribbon-spools are attached. The pawls *W W'* are connected together at their free ends by a bar, *W*², that passes across from one to the other of the pawls. Said bar *W*² rests and slides against the inner face of the bar *K*, and is provided at or near its center with a downwardly-projecting tooth, *w*, that engages alternately with detents *w'* when the bar *W*² is forced back and forth.

*W*³ *W*⁴ designate rods projecting downward from the bar *W*², near the ends thereof, said rods *W*³ *W*⁴ passing across below the spools in the track of the flap *P*, as hereinbefore described, and when struck by said flaps operate to move the bar *W*² longitudinally, and so bring one or the other of the pawls *W W'* into engagement with the ratchet-wheels *N N'*, the tooth *w* and detent *w'* operating to hold the pawls in engagement with the ratchet-wheels, as hereinbefore stated. It will be understood that the ratchet-wheels *N N'* are rotated by the up-and-down movement of the bar *K*.

The mechanism whereby the carriage is moved forward and backward may be combined in the following-described manner, to wit:

Y represents a lug depending from the lower surface of the top *A*, at the rear edge thereof, and over the ratchet-wheel *F*². To the face of the lug is pivoted a pawl or pallet, *Y'*.

Upon the lower surface of the upper portion of the pawl *Y'* is a tooth, *y*, the extreme end *y'* of the opposite end *y'* also operating as a tooth, and when the pawl *Y'* is oscillated against the toothed surface of the wheel *F*² said wheel is moved forward step by step in a manner similar to that shown and described hereinbefore.

From the rear side of the pawl *Y'*, at the forward upper end thereof, project two lugs, *y*², between which is pivoted the upper end of a link, *Y*⁴, the lower end of which is pivoted to the rearwardly-extending arm *j'* of the rock-shaft *J*, operated by the bar *K* when said bar is raised or lowered by the action of the keys.

*y*³ designates a lug projecting from the forward upper end of the pawl, upon the inner side thereof, upon which rests and slides an extension, *y*³, of the back-set rod *R*. Said pawl or pallet *Y'* and back-set rod *R*, when placed side by side and in position for operation, have a combined thickness equal to that of the ratchet-wheel *F*², and rest above said wheel. When the ratchet-wheel is being operated in forward direction, the toothed end of the back-set rod *R* is raised out of engagement with the ratchet-wheel *F*² by the

lug y^5 upon the pawl Y' , as will be readily understood.

I do not limit myself to the exact form of mechanism shown and described herein, as many modifications of said mechanism may be made.

I claim as my invention—

1. In a type-writer, the combination of a paper-carriage provided at its rear edge with pivotal lugs, with a longitudinally-moving rack-bar having but one row of teeth and supports, substantially as described, a fixed actuating gear-wheel, and means, substantially as herein described, whereby the rack-bar and carriage are moved backward with step-by-step motion, as and for the purpose herein set forth.

2. In a type-writer, the combination of the paper-carriage and a longitudinally-moving rack-bar with an actuating gear-wheel provided upon its rear face with a band-wheel or drum and ratchet-wheel controlled by a pallet, and means, substantially as described, whereby said ratchet-wheel, drum, and actuating gear-wheel are rotated, as and for the purpose set forth.

3. In a type-writer, the combination of a paper-carriage, a longitudinally-moving rack-bar, a gear-wheel provided upon its rear face with a drum and ratchet-wheel, and rotated by an actuating spring and strap, with a pawl or pallet engaging with the ratchet-wheel and operated by an arm projecting from a rock-shaft, and connected through a bar, K , with the type-keys, whereby when said type-keys are successively depressed and released the carriage is caused to move forward with step-by-step motion, substantially as herein described.

4. In a type-writer, the combination of a paper-carriage hinged at its rear edge to a longitudinally moving rack-bar actuated by a gear-wheel mounted upon the frame, having a drum to which motive power is applied, the ribbon-spools and ratchets, with a reciprocating bar for operating the ribbon-spools, and means, substantially as described, whereby the reciprocating bar is operated by the forward rotation of the spur-gear wheel, as and for the purpose set forth.

5. In a type-writer, the combination of the spur-gear wheel F , mounted upon a stud projecting from a hanger, G , said gear-wheel provided upon its rear side with a drum, F' , to which a strap, h , from the actuating-spring case h' is attached, and ratchet-wheel F^2 , and pawl or pallet I , with a ratchet-wheel, L , mounted upon the stud f in front of the spur-wheel, said ratchet-wheel adapted to be moved forward and held from backward movement by a pawl, L' , on spur-wheel F , bar M , fulcrumed upon the stud f against the face of the ratchet-wheel L , and provided with a spur or tooth, m' , held in engagement with the teeth of the wheel L by a spring, M' , whereby when the spur-wheel is rotated in forward direction, the bar M will be moved back and forth, and

when said wheel is moved backward the bar will remain at rest, and the ribbon-spools and ratchet, substantially as herein described, and for the purpose specified.

6. In a type-writer, the combination of a reciprocating bar, M , having teeth m' and slot m^8 , shafts $O O'$, ratchet-wheels $N N'$, and spools $O^2 O^3$, having flaps P , with the swinging arms $n' n^{12}$, having projecting arms or rods $n^8 n^{11}$, and connected together by rod n^{10} , whereby the teeth m' of the bar M are caused to alternately engage with the teeth of the ratchet-wheels $N N'$, and thus reverse the motion of the spools $O^2 O^3$, substantially as herein described.

7. In a type-writer, the combination of ribbon-spools provided with flaps P , formed of slats p , hinged together and to the body of the spools by cloth p' , whereby when the spools are turned in one direction said flap shall be folded against and lie upon the surface of the spool, and when said spools are turned in opposite direction shall remain extended and radially projecting therefrom, ratchet-wheels $N N'$, bar M , and means, substantially as described, for causing said bar to alternately engage with either of the ratchet-wheels $N N'$, substantially as herein described, and for the purpose set forth.

8. In a type-writer, the combination of the ratchet-wheel F^2 , spur-gear wheel F , and gear rack-bar C with pawl R , levers R' , and connecting-rods $r^4 r^5$, whereby the carriage is moved backward while the gear-wheel F is moved forward, substantially as herein described.

9. In a type-writer, the combination of the carriage B , hinged to the rack-bar C , spur-gear wheel F , drum F' , ratchet-wheel F^2 , and their operating devices, with a longitudinally moving rod, R , provided at its outer free end with tooth r^2 , bell-crank levers $R' R^2$, resetting-spring R^3 , and connecting-rods $r^4 r^5$, whereby said rod is operated from a key or keys of the machine, substantially as herein described.

10. In a type-writer, the combination of the bar K , attached to rock-shaft J , and moved up and down by the action of the type-lever keys, arm j' , and bell-crank pawl I , with the ratchet-wheel F^2 , pawl L' , ratchet-wheel L , bar M , and the ribbon-spools, substantially as described.

11. In a type-writer, the combination of the bar K , attached to a rock-shaft, J , and moved up and down by the type-lever keys, the ratchet-wheel F^2 , with controlling-pallet, and the back-set rod R , whereby the ratchet-wheel is prevented from moving forward when said back-set rod is being operated, substantially as described.

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

J. A. WHITCOMB.

Witnesses:

JOSEPH FORREST,
H. I. BERNHARD.