

(No Model.)

2 Sheets—Sheet 1.

C. N. FAY.
TYPE WRITING MACHINE.

No. 578,692.

Patented Mar. 9, 1897.

Fig. 1.

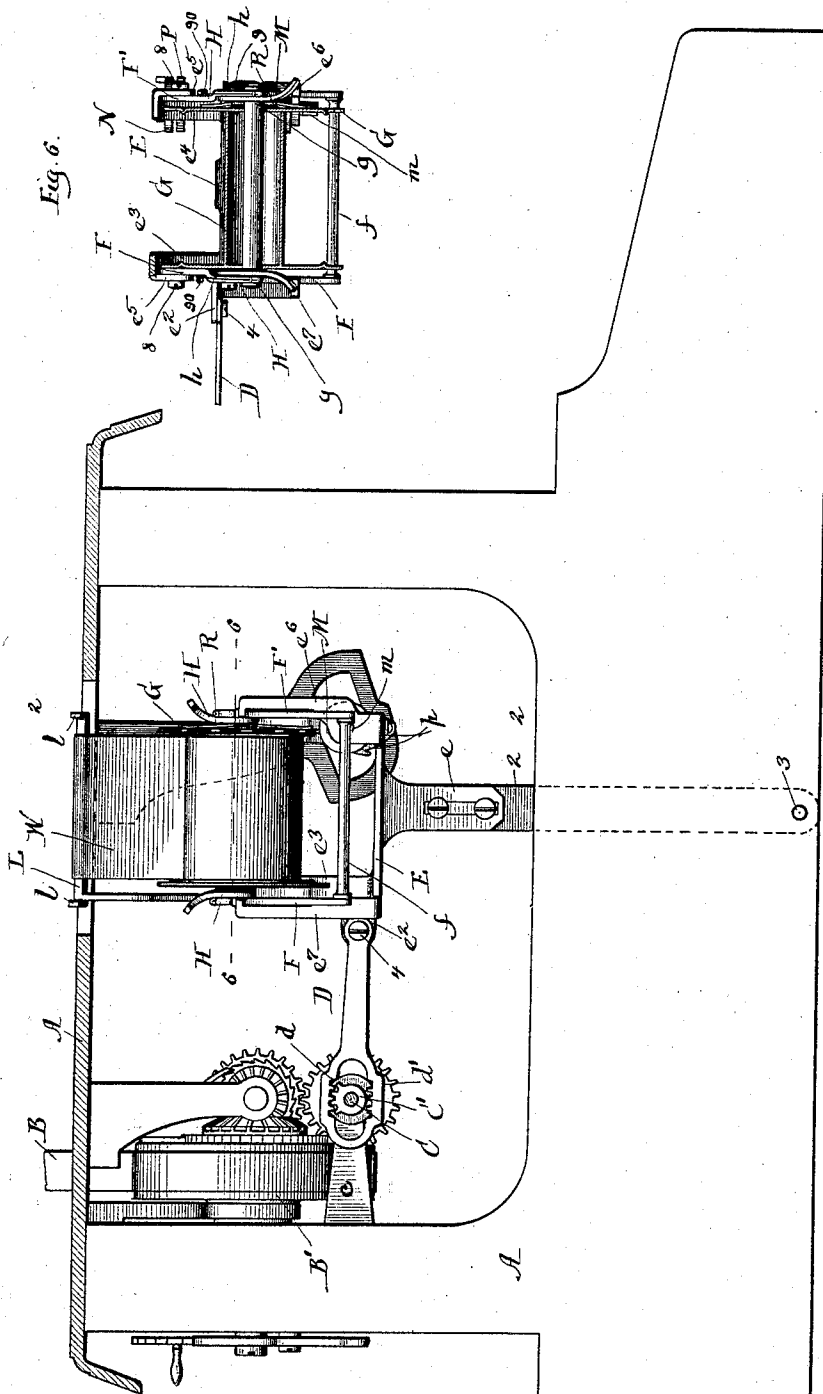
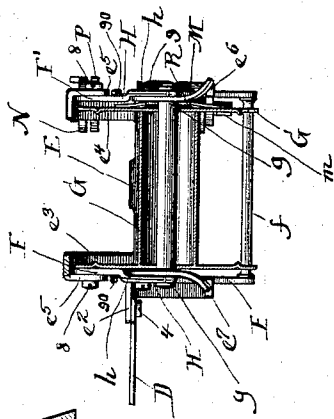


Fig. 6.



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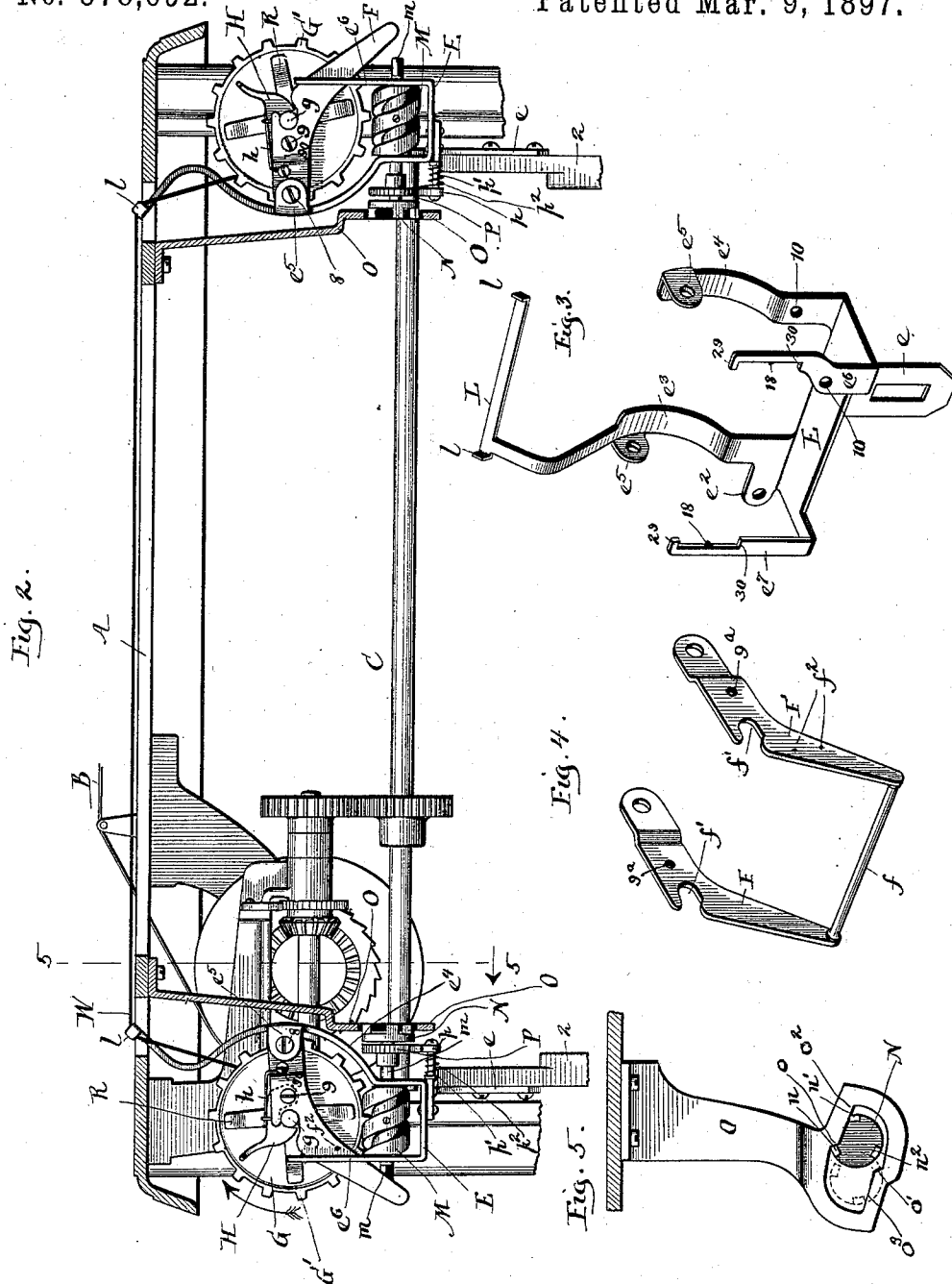
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2 Sheets—Sheet 2.

C. N. FAY.
TYPE WRITING MACHINE.

No. 578,692.

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UNITED STATES PATENT OFFICE.

CHARLES NORMAN FAY, OF CHICAGO, ILLINOIS.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 578,692, dated March 9, 1897.

Application filed April 4, 1895. Renewed January 9, 1897. Serial No. 618,673. (No model.)

To all whom it may concern:

Be it known that I, CHARLES NORMAN FAY, a citizen of the United States, residing at the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Type-Writing Machines, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My present invention has for its object to provide improved mechanism for feeding the inking-ribbon of a type-writing machine; and the invention relates more particularly to that class of inking-ribbon-feeding mechanism in which the inking-ribbon is reciprocated back and forth laterally while at the same time it is advanced longitudinally, so that the lines of impact of the type occur in zigzag manner across the face of the ribbon and thus more effectively utilize its entire surface.

The invention consists of various novel features of construction and combination of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the claims at the end of this specification.

Figure 1 is a view in side elevation of the frame of a type-writing machine having my invention applied thereto. Fig. 2 is a view in vertical longitudinal section through the frame upon line 2 2 of Fig. 1. Fig. 3 is a detail perspective view of one of the spool-carrying frames. Fig. 4 is a detail perspective view of one of the spool-supports. Fig. 5 is a view in vertical section on line 5 5 of Fig. 2. Fig. 6 is a view in horizontal section on line 6 6 of Fig. 1.

A designates the frame of the machine, the top plate of which is provided with the usual circular opening above the type-basket and as well also with the opening to admit the carriage-tape B and openings through which project the upper ends of the guide-arms that sustain the inking-ribbon. The carriage-tape B is wound upon the usual spring-drum B', from which motion is transmitted through appropriate gearing, such, for example, as illustrated, to the ribbon-feed shaft C, that extends from end to end of the machine at its back, the ends of the shaft C being journaled in suitable bearings or brackets c. Upon

each end of the shaft C is mounted a segment-gear C', adapted to engage alternately with the upper and lower teeth *d* and *d'* of a driving-rod D.

In the drawings I have shown only one rod D, but it will be understood that a similar rod is provided at the opposite end of the machine. Each of the rods D is connected to one of the frames E, that carry the spools G whereon is wound the inking-ribbon W, the preferred construction of these frames being more particularly illustrated in Fig. 3 of the drawings. Inasmuch as the spool-carrying frames are the same at each side of the machine a description of one will suffice for both.

Each spool-carrying frame E is by preference formed from a single plate of metal, the base of the frame being provided with a downward extension *e*, that is attached, as by bolts *e'*, to the upper end of a swinging arm 2, that is pivoted, as at 3, at the base of the machine, this arm serving to sustain the spool-carrying frame in manner permitting it to be freely swung back and forth by the driving-rod D, attached thereto. From the rear of the spool-carrying frame projects a perforated lug *e*², to which is connected, as at 4, the forward end of the rod D. The frame E is provided with the upwardly-extending arms *e*³ and *e*⁴, that carry the perforated lugs *e*⁵, to which lugs are pivotally connected, as at 8, the side arms F F' of the spool-support. This spool-support is preferably constructed as shown in Fig. 4 of the drawings, that is to say, with its side arms F F' connected by a cross-bar *f*, and these side arms are furnished with open bearings *f'* to receive the journals *g*, that project from the ends of each of the ribbon-carrying spools G. By preference also the front of each of the spool-carrying frames E is provided with the vertical guide-arms *e*⁶ and *e*⁷, between which extend the arms F F' of the spool-support, and preferably also the arms *e*⁶ and *e*⁷ are furnished with lugs 18 to engage seats *f*² in the side arms F F' and thus better retain the support either in its raised or depressed position, as will presently more fully appear. The arms *e*⁶ and *e*⁷ are provided also with shoulders 29 and 30 (see Fig. 3) to limit the movement of the spool-supporting arms in upward or downward direction. The pivot pins

or screws 9, that pass through holes 9^a in the side arms F and F', have pivotally mounted thereon the latches or hooks H, that serve to retain the journals *g* of the spools in the open bearing *f'* of the spool-supporting arms, and preferably each of the latches H is forced normally downward by a spring *h*, the free end of which bears against the latch, while its opposite end is fastened, as at 90, to one of the arms F. In order to better guide the inking-ribbon W, I prefer to provide the spool-carrying frame with the guides L, these guides being formed or attached at the upper ends of the arms *e*³ and having upturned ends *l* to guide and retain the ribbon.

Each of the spools whereon the inking-ribbon is wound is provided or has attached thereto a worm-wheel G', my preferred construction being to form the teeth of the worm-wheel of each spool directly upon the periphery of the end plate of such spool, and this wheel G' meshes with a worm M, that is carried by the spool-carrying frame. Preferably the shaft *m* of the worm M is held in bearings 10, formed in the arms *e*⁴ and *e*⁶ of the spool-carrying frame E, the ends of each of the shafts *m* projecting beyond their bearings. The inner end of the worm-shaft *m* is furnished with a spur-wheel N, the outwardly-projecting teeth *n*, *n'*, and *n*² of which enter a space formed in the lower end of the shifter or hanger O. The shifter O is provided with the straight portions *o*² and *o*³, these shoulders and straight portions serving to effect and as well limit the desired movement of the spur-wheel and, through the movement of this wheel, of the worm-shaft *m*. By preference the shaft *m* is provided also with a ratchet-wheel P, that is engaged by a suitable pawl *p*, this pawl being carried at the end of a rod *p'*, attached to the under side of the spool-carrying frame E, and spring *p*² serves to hold the pawl *p* in normal engagement with the ratchet-wheel P and thus prevents the backward movement of the worm-shaft *m*.

From the foregoing description the operation will be seen to be as follows: Motion being imparted to the shaft C from the spring-drum in manner well understood, such motion will be transmitted by the rods D to the spool-carrying frames at the opposite ends of the machine, thus causing these frames to be reciprocated back and forth as the segment-gear *c'* meshes alternately with the upper and lower teeth *d* and *d'* of each of the rods D. By this means the inking-ribbon will have imparted thereto a step-by-step lateral back-and-forth movement in unison with the movements of the paper-carriage, thereby exposing a fresh surface to the impact of the types at each operation of the keys.

The longitudinal advance or lengthwise feed of the ribbon W from one spool onto the other is effected by means of the worm M and the worm-wheel G' in conjunction with the spur-wheel N and the shifter O. Thus it will

be seen that the spur-wheel N, being movable back and forth with the spool-carrying frame, traverses the open space at the lower end of the shifter O, and as the spur-wheel moves toward the rear from the position shown by dotted lines to that shown by full lines in Fig. 5 one of its teeth *n* will strike against the shoulder *o* of the shifter O, thereby causing a partial revolution of the spur-wheel N, the worm M, the worm-wheel G', and the ribbon-spool G. The spool G is thus rotated in the direction of the arrow, Fig. 2, so as to wind the ribbon W onto that spool and off the spool at the opposite end of the machine.

It will be seen also by reference more particularly to Fig. 5 of the drawings that as the spur-wheel N completes its travel toward the rear the tooth *n'* will contact with the straight surface *o*² of the shifter O, and thus limit the further turning of the spur-wheel. As the direction of travel of the spool-carrying frame and of the parts sustained thereby is reversed by the shifting rod D the spur-wheel N will be moved in forward direction along the open space at the bottom of the shifter O, thereby causing the tooth *n*² to contact with the shoulder *o'* of the shifter and turn the spur-wheel N a further partial revolution, and thus further wind the inking-ribbon W upon the spool G. At the completion of this forward movement of the spur-wheel the tooth *n*² will contact with the straight surface *o*³ of the shifter and check the further turning of the wheel. It will thus be seen that as the spool-carrying frames at the opposite ends of the machine are shifted back and forth by their respective rods D, so as to cause the lines of impact of the types to occur across the face of the inking-ribbon W, a slight longitudinal advance or feed of the inking-ribbon will occur during each forward and backward shift of the spool-carrying frames. By mounting the spools G upon the pivoted supports the worm-wheel G' of either spool may be thrown into or out of engagement with the corresponding worm M, so that when one spool has its worm-wheel in gear, in order to effect the positive movement of the spool, the opposite spool will have its worm-wheel disengaged from the worm, so as to allow the ribbon to be freely drawn from off such spool. The disengagement of either of the spools can be readily effected by merely swinging upward the supporting-arms F F', and the arms will be retained in their raised or depressed position by the lugs 18, engaging their seats *f*². By providing the spool-supporting arms F F' with open journal-bearings *f'* the ribbon-spools G can be readily inserted therein or withdrawn therefrom, it being simply necessary to lift the catches H, that normally retain the spools in place.

It will be understood of course that when the ribbon has been completely wound off of one spool and onto the other the spool onto which the ribbon has been wound should have its worm-wheel disengaged from its worm and

the spool at the opposite side of the machine should then have its worm-wheel thrown into engagement with its worm, thereby causing the reverse movement of the ribbon. This may be done by moving the two spools independently of each other, or both may be connected to a common shifting rod serving to move one in and the other out of engagement simultaneously by a single movement of the operator's hand. By preference each of the worm-shafts *m* has one of its ends squared to receive a suitable key in order to permit the manual winding of the ribbon-spools, or, if preferred, a small thumb-wheel may be provided at the outer ends of the worm-shafts. Preferably also each of the ribbon-spools is furnished with tension-springs *R*, that bear upon its face and serve to check the accidental slipping of the spool. The tension-springs *R* are shown as formed with a series of arms and with a central opening that sets over the journal *g* of each spool and is located between the end of the spool and the retaining-latch *H*. The ribbon-guides *L* are preferably extended to a point slightly above the top of the main frame in order to avoid the wear of the ribbon against the frame as the ribbon is shifted both laterally and longitudinally.

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

1. In a type-writing machine, the combination with a laterally-movable spool-carrier and spool supported thereby and with means for automatically shifting said carrier back and forth, of a wheel for imparting revolution to said spool, a shaft mounted in said carrier and suitably geared to said wheel and with suitable mechanism for imparting revolution to said shaft as said carrier is shifted back and forth.

2. In a type-writing machine, the combination with a laterally-movable spool-carrier and spool supported thereby and with means for automatically shifting said carrier back and forth, of a wheel for imparting revolution to said spool, a shaft mounted in said carrier and suitably geared to said wheel, said shaft having one of its ends projecting beyond its bearing whereby the shaft may be manually turned.

3. In a type-writing machine, the combination with a laterally-movable spool-carrier and ribbon-spool and means for automatically shifting said carrier back and forth, of a wheel and worm supported by said carrier for effecting the longitudinal advance of the ribbon and suitable means for imparting movement to said worm.

4. In a type-writing machine, the combination with a laterally-movable spool-carrier and spool supported thereby, and with means for automatically shifting said carrier back and forth, of a worm and wheel sustained by the carrier and serving to impart revolution

to the spool, the shaft of said worm being provided with a wheel having projections, and a shifter adapted to engage the projections of said wheel in order to impart revolution to said worm.

5. In a type-writing machine, the combination with a laterally-movable spool-carrier and spool supported thereby, and with means for automatically shifting said carrier back and forth, a wheel and worm sustained by said carrier and movable therewith, a spur-wheel connected to the shaft of said worm and a shifter for turning said spur-wheel, said shifter being provided with shoulders to engage the projections of the spur-wheel.

6. In a type-writing machine, the combination with a laterally-movable spool-carrier and spool supported thereby, and with means for automatically shifting said carrier back and forth, of a wheel and worm supported by said carrier for effecting the longitudinal advance of the ribbon, a wheel connected to the worm-shaft and provided with projections, and a fixed shifter having oppositely-disposed shoulders or stops interposed in the path of said projections in order to engage the same and thus effect the turning of the wheel, in the same direction at each end of the travel of the carrier.

7. In a type-writing machine, the combination with a laterally-movable spool-carrier and spool supported thereby, and with means for automatically shifting said carrier back and forth, of a wheel and worm supported by said carrier for effecting the longitudinal advance of the ribbon, a spur-wheel connected to the worm-shaft and a fixed shifter having oppositely-arranged stops or projections to engage the projections of the spur-wheel and having parts serving to limit the revolution of said spur-wheel.

8. In a type-writing machine the combination with a ribbon-spool-carrying frame, of a ribbon-spool and a wheel for imparting revolution to said spool, a shaft whereby said spool and wheel are carried, gear mechanism supported by said spool-carrying frame for driving said spool and a vertically-movable support for said spool-shaft having open journal-bearings to receive said shaft, said movable support serving to effect the disengagement of said spool from the gear mechanism whereby it is driven.

9. In a type-writing machine, a spool-carrying frame *E* provided with the upwardly-extending arms *e*³ and *e*⁴ and a spool-support comprising arms *F* and *F'* pivotally connected to said arms *e*³ and *e*⁴ at their rear and connected at their front by a cross-bar whereby the support may be shifted to move the spool from engagement with its actuating mechanism.

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