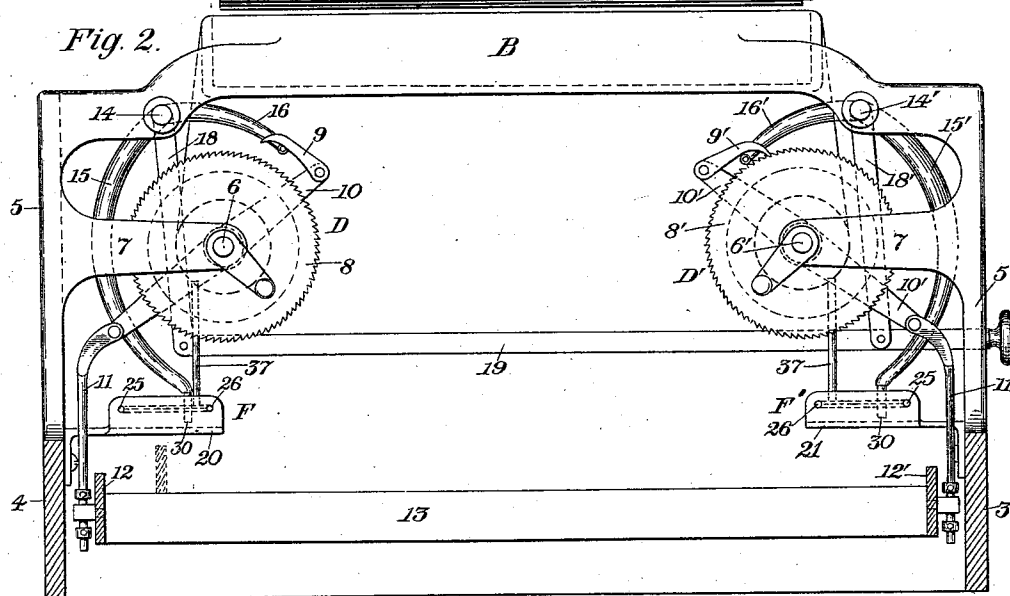
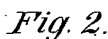


2 Sheets—Sheet 1.

No. 536,023.

Patented Mar. 19, 1895.



J. L. Edwards Jr.
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John M. Fairfield.
By his Attorney,
F. H. Richards.

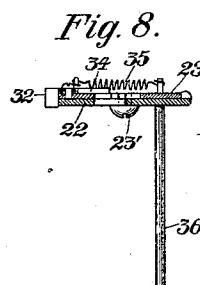
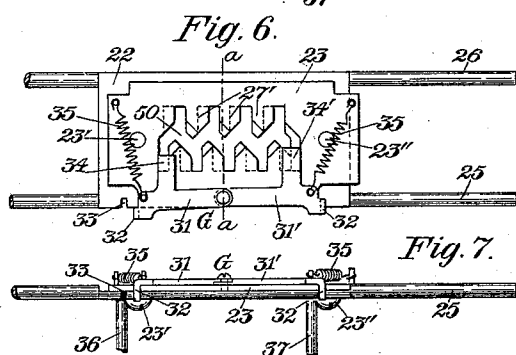
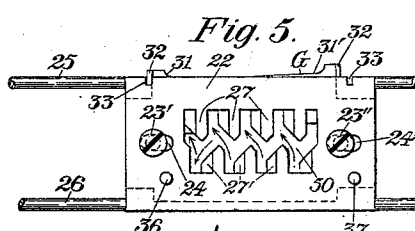
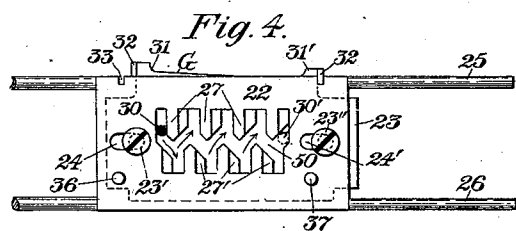
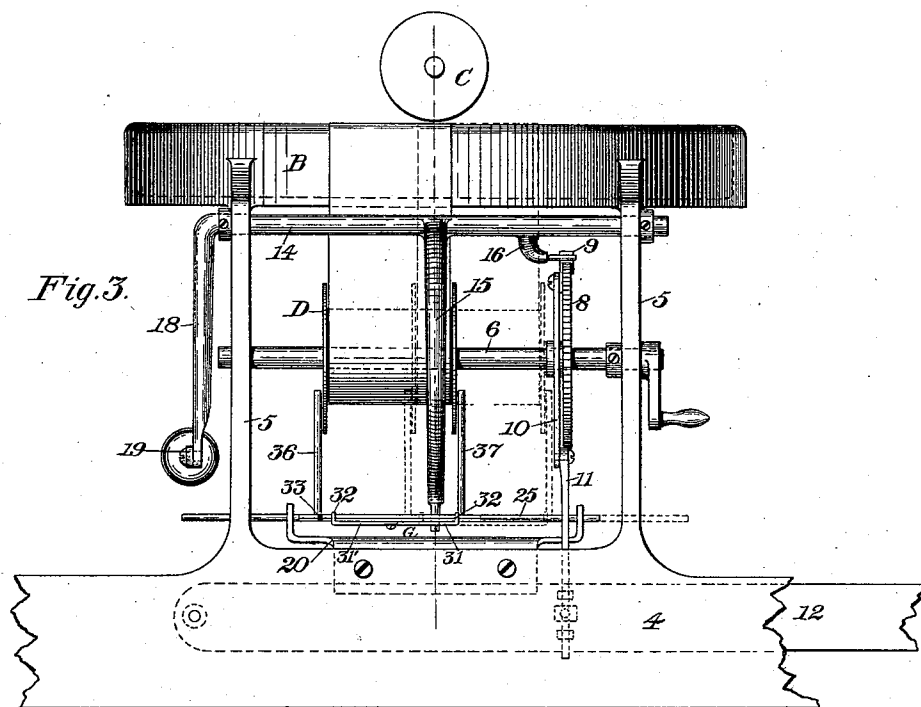
(No Model.)

2 Sheets—Sheet 2.

J. M. FAIRFIELD.
TYPE WRITING MACHINE.

No. 536,023.

Patented Mar. 19, 1895.



Witnesses:

J. L. Edwards Jr.
Fred. J. Dole.

Inventor:

John M. Fairfield.
By his Attorney,
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UNITED STATES PATENT OFFICE.

JOHN M. FAIRFIELD, OF HARTFORD, CONNECTICUT.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 536,023, dated March 19, 1895.

Application filed March 3, 1894. Serial No. 502,271. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. FAIRFIELD, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Type-Writers, of which the following is a specification.

This invention relates to type-writers, and has special reference to ribbon-feeding-and-shifting mechanism therefor.

The object of this invention is to provide in connection with a type-writer frame, mechanism whereby the ribbon may be moved or fed forward in a straight line its entire length, or approximately so, and whereby the direction of the feed-movement of the ribbon may be quickly changed when desired and the ribbon shifted sidewise in parallel lines simultaneously with said change of feed; and also to provide in connection with such feed-mechanism, improved switch mechanism adapted for regulating the transverse movement of the ribbon, and for automatically changing the direction of said transverse movement.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view of a portion of a type-writer with my improvements applied thereto, the platen being removed and a portion of the framework and ribbon-reel being broken away to more clearly show certain parts of the mechanism. Fig. 2 is a front elevation of a portion of a type-writer with my improvements applied thereto, a platen being shown in full lines simply to illustrate the relative position thereof with relation to the frame of the machine. Fig. 3 is a side elevation of the same. Fig. 4 is a plan view of one of the switch-slides for regulating the transverse shifting-movement of the ribbon, said figure showing the switch-slide in position for directing the movement of the ribbon-carrier toward the rear of the machine. Fig. 5 is a view similar to Fig. 4, showing the switch-slide in position for directing the movement of the ribbon-carrier toward the front of the machine. Fig. 6 is an under side view of said switch-slide drawn in projection with Fig. 4. Fig. 7 is a side elevation of said switch-slide drawn in projection with Fig. 6. Fig. 8 is a cross-sectional view of said switch-slide taken in line *a-a*, Fig. 6.

Similar characters designate like parts in all the figures.

Briefly stated, the ribbon-feed and shifting-mechanism in the preferred form thereof hereinafter more fully described, comprises two remotely-disposed revoluble ribbon-carriers, a feeding-device in connection with each ribbon-carrier and adapted for feeding the ribbon longitudinally in a line parallel with the side edges thereof, shifting-devices consisting of switch-slides and switch-arms, or levers, in connection with each feed-device and adapted for shifting the ribbon transversely in parallel lines, and means for simultaneously throwing one of the feeding devices into, and the other feeding-device out of engagement with the ribbon-carrier to reverse the direction of longitudinal feed-movement of the ribbon, and at the same time shift said ribbon sidewise to bring another portion thereof contiguous to the impact or printing point of the platen.

The framework of the type-writer is, or may be, of any usual or suitable construction, it being herein shown as consisting of a circular top-plate, B, having the usual central opening 2 therein, the side plates, or rails, 3 and 4, and the front and back, or carrier-standards, or uprights, 5, which standards support the top-plate B as will be fully understood by reference to Figs. 1, 2 and 3 of the drawings. The platen C shown in Figs. 2 and 3, will be supported in the usual manner by a platen-carriage (not shown) of any suitable construction or organization.

The ribbon-carriers in the form thereof herein shown consist of two remotely disposed reels, D and D', located one at each side of the frame below the top-plate B, said reels being carried by shafts, 6 and 6', respectively, supported at their ends in bearings formed in suitable brackets as 7, on the standards 5; the reels being preferably splined to said shafts so as to be capable of longitudinal movement thereon.

As a means for directly rotating the reels D and D' alternately to feed the ribbon longitudinally first in one, and then in the opposite direction, I have provided the shafts 6 and 6' of said reels with a pawl-and-ratchet feed-device, which in the form thereof herein shown, consists of two ratchet-wheels 8 and

8', one of which is secured to the shaft 6, and the other of which is secured to the shaft 6', and detent, or feed-pawls, 9 and 9', respectively, in position and adapted for engagement with the ratchet-teeth of the wheels 8 and 8', respectively, and pawl-carrying and actuating mechanism, the construction and organization of which will be hereinafter fully described.

The two ratchet-wheels 8 and 8' are so disposed upon their respective shafts that they may be directly rotated by the feed-pawls in opposite directions, as will be understood by reference to Fig. 2 of the drawings, and the pawls 9 and 9' are oppositely-disposed and are pivotally supported at the inner ends of two reciprocatory feed-levers, 10 and 10', mounted for independent movement upon the shafts 6 and 6', respectively. These feeding-devices just described are substantial duplicates of one another, but are oppositely-disposed and arranged for operation in opposite directions alternately.

As a means for operating the feed-levers of the two feed-devices, I have connected said levers through the medium of connecting rods 11 and 11', with the opposite side-levers 12 and 12' of the universal bar 13 underlying the key-levers of the type-writer, (one of said key-levers being partially shown in dotted lines) said universal bar being held up against the key-levers by any suitable means, as, for instance, a spring (not shown) and adapted to be operated by any one of said key-levers in a manner common to similar universal bars in type-writer machines of such types as the "caligraph."

As will be hereinafter more fully described, the two feed-devices are organized for alternate and reciprocal effective operation,—that is to say, when the ribbon is being moved longitudinally in one direction by one of the feed-devices, the actuating-mechanism of the opposite feed-device moves idly without affecting the reel to which it is connected, and vice versa.

As a means for throwing one of the feed-devices into operation and for simultaneously throwing the opposite feed-device out of operation, and at the same time shifting the ribbon-carriers transversely of the platen C in one or the other direction, I have provided in connection with the feed-mechanism a combined pawl-lifting and ribbon-shifting device, which in the form thereof herein shown, comprises two switch-slides F and F', supported for shifting movement transverse of the platen C; and two rock shafts 14 and 14' journaled at their ends in the standards 5 adjacent to the ribbon-carrier shafts 6 and 6', respectively, and having thereon two oppositely-disposed levers, or arms 15 and 16, and 15' and 16', respectively, the ones 15 and 15' of which actuate the switch-slides connected with the ribbon-carriers and control the transverse shifting movement of said ribbon-carriers, and will be herein designated the "switch-

arms," and the others 16 and 16' of which engage and control the engagement and disengagement of the feed-pawls 9 and 9' with the ratchet-wheels 8 and 8', and will be herein termed the "pawl-lifting levers." The rock-shafts 14 and 14' each have a depending actuating-arm, 18 and 18', respectively, at one end thereof, which arms are operatively connected together in parallelism by an operating-rod, 19, to which said levers are pivotally secured at the lower ends thereof. By moving this lever 19 in one direction by hand, the rock-shafts 14 and 14' are simultaneously rocked, and, through the medium of the oppositely-disposed pawl-lifting levers 16 and 16', respectively, thereon, throw one of the feed-pawls, as 9, out of engagement with its respective ratchet-wheel 8, and the other feed-pawl, as 9', into engagement with its respective ratchet wheel 8', and at the same time, through the medium of the switch-levers 15 and 15' located on said shafts and the switch-slides F and F', respectively, connected therewith, by means of the pins 30 on the ends of the shift-levers 15 and 15' which engage slots in said slides, as will be hereinafter more fully explained, shift both of the ribbon-carriers D and D' longitudinally of their respective shafts, a distance sufficient to bring another portion of the ribbon carried thereby contiguous to the impact or printing-point of the platen. These switch-slides F and F', which constitute, in part, the shifting-mechanism for, and control the transverse movement of the ribbon, are herein shown supported for movement transversely of the platen, in brackets, 20 and 21, secured one to each side-rail of the type-writer frame, as most clearly shown in Figs. 1, 2 and 3, and are operated by the operating-rod 19, through the switch-levers 15 and 15' connected therewith.

In the form herein shown, each switch-slide comprises an upper and lower switch-plate, 22 and 23, respectively, which are adjustably connected together preferably by means of studs, or screws, 23' and 23'', secured to one of said plates and extended through elongated slots 24 and 24', respectively, in the other of said plates, as clearly shown in Figs. 4 and 5 of the drawings. One of said plates is herein shown as provided with carriers which are in the nature of rods, 25 and 26, extending out longitudinally from the ends thereof, which rods are supported at their ends for longitudinal movement in suitable bearings formed in the respective bracket (20 or 21) which supports said slide.

The plates 22 and 23 are each centrally recessed and having oppositely-disposed inwardly-projecting guiding-fingers, or prongs, 27 and 27', respectively, whose adjacent faces are V-shaped or inclined as shown in Figs. 4, 5 and 6, to form oppositely-disposed inclined bearing-faces against which the end, 30, of the switch-lever which extends between said prongs may bear in its reciprocation to shift the switch-slide longitudinally in one or the

other direction. The inwardly projecting guiding-fingers of each switch-plate, at one side thereof, are so disposed, alternately, with relation to the opposite guiding-fingers, that the inclined bearing-faces of the two sets are in parallel lines and the apexes of said guiding-fingers terminate at points midway between the points or two opposite guiding-fingers, thus forming a zigzag guiding path or track, 50.

As a means for increasing the length of the bearing faces of the oppositely disposed guiding fingers so as to insure the shifting of the plates by the reciprocation of the switch-arm to carry the next adjacent guiding-finger, upon a reciprocation of said switch-arm, past said bar, the guiding-fingers of one plate are made of a width substantially twice the width of the adjacent fingers of the adjacent plate, as will be fully understood by reference to Fig. 6 of the drawings, and will be made of a sufficient less length as to insure the coinciding of the bearing-faces of the fingers of the plate with the contiguous bearing-faces of the fingers of the adjacent plate at one or the other side of said fingers, according to whether the plates are shifted, relatively to each other, in one or the other direction.

In the drawings, the lower plate 23 of the switch-slide is shown made shiftable with relation to the upper plate 22. This shifting movement of one plate with relation to the other to change the direction of movement by increasing the length of bearing face at one or the other side of the guide fingers, is intended to take place only at the extreme end of the transverse movement of the switch-slide.

In consequence of the peculiar construction and disposition of the guiding-fingers 27 and 27' of the plates 22 and 23, a "stepped" guiding-track or path 50 is formed which extends sidewise of the plates, back and forth, in advancing inclined lines or in a "zigzag" direction, whereby, through the medium of the switch-lever, said plates may have together, a step-by-step longitudinal movement.

As a means for locking the two switch-plates of the switch-slide together in one position, and as a means for automatically unlocking, and shifting one of said plates relatively to the other, and for re-locking said plates in this position, I have provided a spring-actuated locking-device, designated in a general way by G, pivotally connected with one of said plates and adapted for engagement with the other of said plates. In the form thereof herein shown, this locking-device comprises two oppositely disposed levers, 31 and 31', pivotally secured at their inner ends to one of said plates, and each having detent-catches, 32, in position and adapted for engagement with notches, 33, formed in the other of said plates. These levers 31 and 31' have inwardly projecting actuating-arms, 34 and 34', respectively, whose inner ends project into the path of movement of the lower

end 30 of the switch-arm, and are preferably located at opposite ends of the recess in the switch-plates.

The operation of the switch-mechanism just described is as follows: Assuming the switch-lever 15 to be in the position indicated by the dot 30 as seen in Fig. 4, a shifting-movement of the rock-shaft to which said lever is connected, by means of the hand-lever 19, will carry said switch lever in the direction indicated by the arrows in said figure, said lever first striking the inclined bearing-face of the guiding-finger at the extreme left-hand end in said figure, which will shift the two switch-plates constituting the slide, a sufficient distance to bring the pin 30 on the shift-lever 15 past the apex of the oppositely-disposed finger next adjacent thereto; when upon a reverse movement of said rock-shaft, usually but not necessarily effected when the end of the ribbon is reached, the lever will engage the inclined bearing face of the oppositely-disposed guiding-finger and repeating the first shifting-operation of the two plates. A continued repetition of these two movements of the rock-shaft by the hand-lever 19 will carry the two plates toward the left-hand in said figure with a step-by-step movement until the switch-lever has reached the position shown by the dot 30' in said figure when it will, in its continued movement, bear against and press the arm 34 of the locking-device outward, throwing the catch 32 of said locking-lever 31' out of engagement with the lock-notch 33 of the upper plate 22, to reverse the positions of the successive steps of the guiding-tracks 50 by the riding of the switch-lever down the oblique faces of the actuated, terminal finger 27' to the end wall of the corresponding oblique slot, and shift the lower plate longitudinally of the upper plate 22 until the opposite locking-lever 31 engages the lock-notch 33 of said upper plate which locks the two plates relative to each other in their shifted position. This operation shifts the guide-fingers of the two plates relatively to each other so as to bring the longer bearing faces at the opposite sides of said fingers to thus change the direction of movement of the two plates or switch-slide automatically upon the continued reciprocations of the switch-lever.

The locking-levers 31 and 31' are provided with suitable springs, 35, for throwing them alternately into engagement with their respective lock-notches. The upper plate 22 of each switch-slide is also provided with upwardly-projecting shifter-arms, 36 and 37, which bear against opposite sides of the ribbon-reels and act to move said reels transversely of the platen upon the movement of the switch-slide.

Having thus described my invention, I claim—

1. In a type-writer, the combination with the frame thereof, of the ribbon-carrier comprising two remotely-disposed reels, two oppositely-operable feed-devices connected one

with each reel, mechanism in connection with each reel and adapted for alternately and reciprocally actuating said feed-devices to feed the ribbon longitudinally in opposite directions alternately and adapted also for throwing one of said feed-devices into operative position and the opposite feed-device into an inoperative position, means for simultaneously shifting the ribbon-carrier to move the ribbon carried thereby transversely and progressively in parallel lines one step upon each reversal of the longitudinal movement thereof, and means controlled by the lateral shifting of said ribbon for reversing the direction of such shifting after a predetermined number of such lateral movements, substantially as described and for the purpose set forth.

2. In a type-writer, the combination with the frame thereof, of two revoluble ribbon-carriers supported for longitudinal movement upon independent shafts, a pawl-and-ratchet feed-mechanism connected with each shaft of each ribbon-carrier and adapted for moving the ribbon carried by said carriers longitudinally in one or the other direction, and combined feed-reversing and ribbon-shifting mechanism comprising oppositely-disposed pawl-lifting arms in engagement with the pawls of the feed-mechanism and adapted to be alternately and reciprocally engaged with and disengaged from the ratchet-wheels, oppositely-disposed switch-arms, shiftable switch-plates in connection with said arms and the ribbon-carriers and adapted for longitudinal movement transversely of the machine, means for rocking said arms to simultaneously throw one of said pawls into and the other out of engagement with its respective feed-wheel and to progressively shift the ribbon-carriers longitudinally of their shafts one step upon each reversal of the movement of the feed-mechanism, and means controlled by the lateral shifting of said ribbon for reversing the direction of such shifting after a predetermined number of such lateral movements, substantially as described and for the purpose set forth.

3. In a type-writer, a ribbon-feeding-and-shifting mechanism comprising a ribbon-carrier supported for transverse and rotary movements, reversing feed-mechanism in connection with said carrier, a reciprocatory switch-slide also in connection with said carrier and adapted for moving the carrier transversely, means in connection with the feed-mechanism and the switch-slide and adapted for simultaneously reversing the feeding operation of said mechanism and for shifting said slide in longitudinal direction to move the ribbon-carrier transversely and progressively one step upon each of such reversals of the feeding operation, and means controlled by the lateral shifting of said ribbon for reversing the direction of said shifting after a predetermined number of such lateral movements, substantially as described and for the purpose set forth.

4. In a type-writer, two remotely-disposed revoluble and transversely-movable ribbon-carriers, mechanism for rotating said carriers in one or the other direction alternately, reciprocatory shifting mechanism in connection with said carriers and adapted for simultaneously moving said carriers transversely in parallel lines, oppositely-disposed reciprocatory arms in connection with the shifting-mechanism and feed-mechanism, means in connection with said reciprocatory arms for simultaneously operating them to shift the ribbon-carriers transversely and progressively step-by-step and at the same time reverse the feeding-movement of said ribbon-carriers, and means also in connection with said reciprocatory arms for reversing the direction of said transverse shifting of the ribbon-carriers after a predetermined number of such transverse movements, substantially as described.

5. In a type-writer, the combination with a transversely-movable ribbon-carrier, of a switch-slide in connection with said carrier and comprising two switch-plates having opposite and remotely-disposed inwardly-projecting guide-fingers, means for shifting said slide to move the carrier transversely, and means for automatically shifting the plates of said slide relatively to each other to change the direction of movement of the slide, substantially as described and for the purpose set forth.

6. In a type-writer, the combination with revoluble transversely-movable ribbon-carriers and with means for rotating said carriers to feed the ribbon thereof longitudinally, of a switch-slide in connection with said carriers and comprising two switch-plates having guiding-fingers contiguous to each other, a reciprocatory switch-lever engaging the fingers of the switch-plates and adapted for moving said plates together in one direction, and means in connection with said plates and in position for engagement by said shifting-levers whereby said plates are automatically shifted relatively to each other at each end of their unitary movement to change the direction of movement of said slide, substantially as described and for the purpose set forth.

7. In a type-writer, the combination with the ribbon-carrier, of a switch-slide in connection therewith and adapted for moving said carrier transversely and comprising two switch-plates having inwardly projecting opposite and remotely-disposed guiding-fingers with inclined bearing-faces, means for shifting said plates relatively to each other to lengthen the bearing faces at one or the other side of said fingers, means for locking said plates in their shifted position, and means for shifting the plates unitarily in one or the other direction to move the ribbon-carrier transversely, substantially as described.

8. In a type-writer, the combination with a ribbon-carrier, of a switch-slide in connection with said carrier and comprising two

plates having guiding-fingers with inclined faces, a shifting-lever connected with said slide and adapted for moving the same longitudinally and for automatically shifting the plates of said slide relatively to each other to change the direction of movement of the slide, substantially as described.

9. In a type-writer, the combination with a ribbon-carrier supported for transverse movement, of a switch having a shiftable step-by-step guiding track, or path, a reciprocatory lever moving in said guiding-track and adapted for moving the switch to shift the carrier transversely, and means for automatically shifting the track to reverse the movement of said switch, substantially as described.

10. In a type-writer, the combination with the ribbon-carrier, of a switch-slide in connection therewith and comprising two switch-plates having inwardly projecting guiding fingers so disposed as to form a step-by-step guiding-track or path for an actuator, a locking-lever pivotally secured to one of said plates and adapted for being thrown into locked engagement with the other of said plates, and having an arm projected into the guide-path at one end thereof, and an actuator extended into said path and adapted for engagement with the arm of the locking-lever to unlock the plates and shift them relatively to each other to change the direction of movement thereof, substantially as described and for the purpose set forth.

11. The herein-described switch-slide for

ribbon-carriers of type-writers, it consisting of two plates shiftable connected together, one of which plates has a lock-notch formed in one edge thereof, and the other of which plates has a locking-lever adapted for engagement with said lock-notch, and both of which plates have inwardly-projecting oppositely-disposed guiding-fingers, substantially as described and for the purpose set forth.

12. In a type-writer, the combination with the shiftable ribbon-carrier, of a switch-slide comprising two plates shiftable-secured together and having contiguous step-by-step guiding-paths or tracks, and having, one of them, lock-notches at opposite ends thereof, two oppositely-disposed locking-levers secured to one of said plates and having laterally projecting arms extended into the guiding path and having detent-catches adapted for alternately engaging the opposite end of the adjacent plate to lock the two plates together when shifted in one or the other direction, and an actuator or switch-lever extended into said guiding-path and adapted for engaging one or the other of said locking lever arms in its travel to shift one or the other of said levers out of engagement with the adjacent plate, substantially as described and for the purpose set forth.

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