(No Model.) 4 Sheets—Sheet 1.

C. E. JOHNSON.

RIBBON FEED REVERSING MECHANISM.

No. 546,067. Patented Sept. 10, 1895.

Fig. 1.

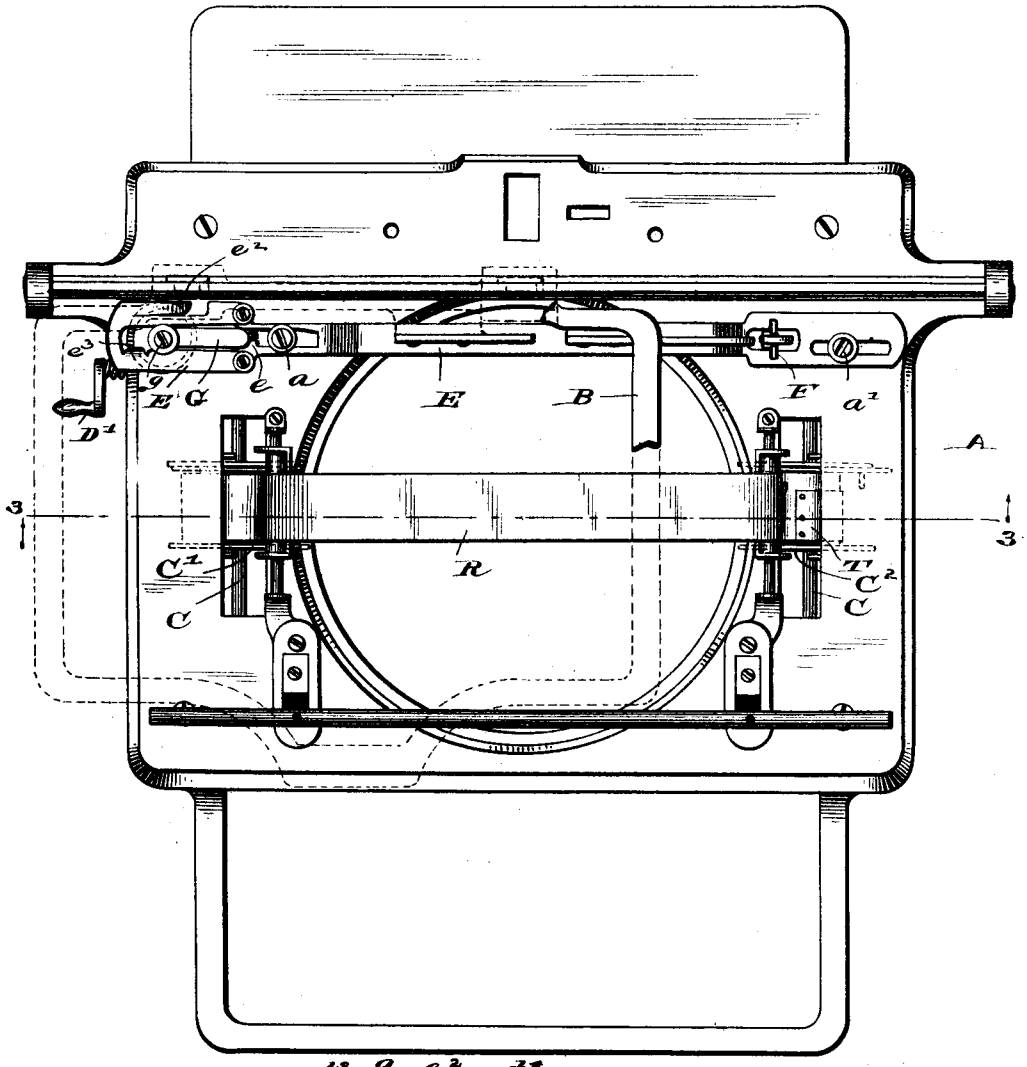
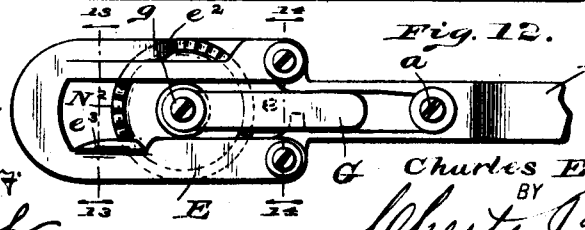


Fig. 12.



WITNESSES:

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(No Model.) 4 Sheets—Sheet 2.

C. E. JOHNSON.

RIBBON FEED REVERSING MECHANISM.

No. 546,067. Patented Sept. 10, 1895.

Fig. 2.

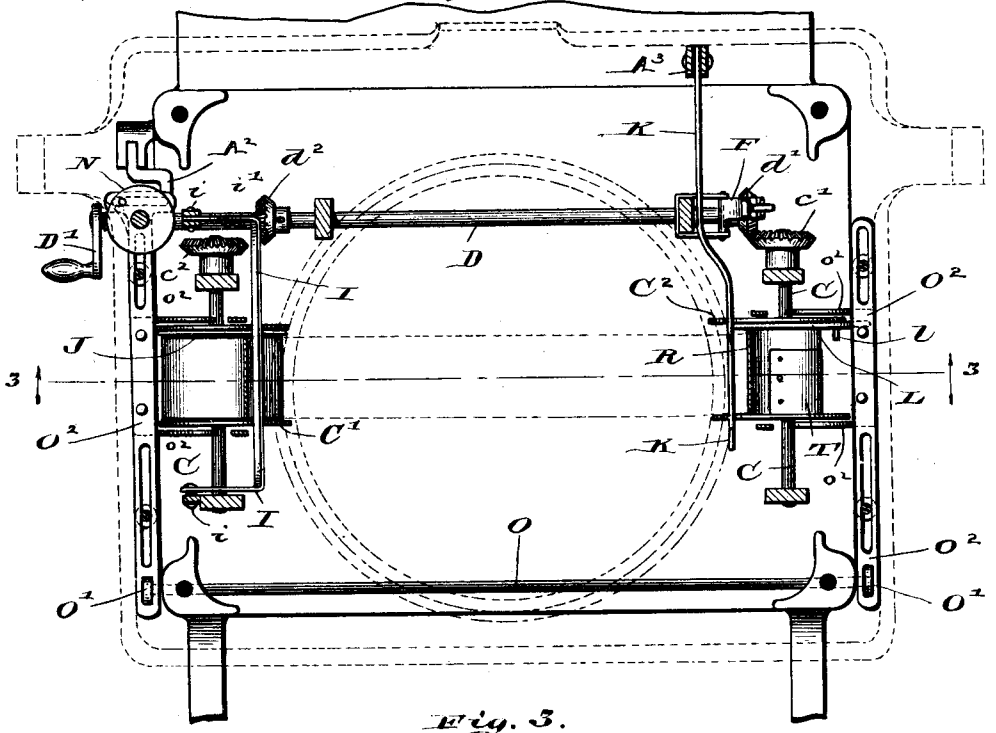


Fig. 3.

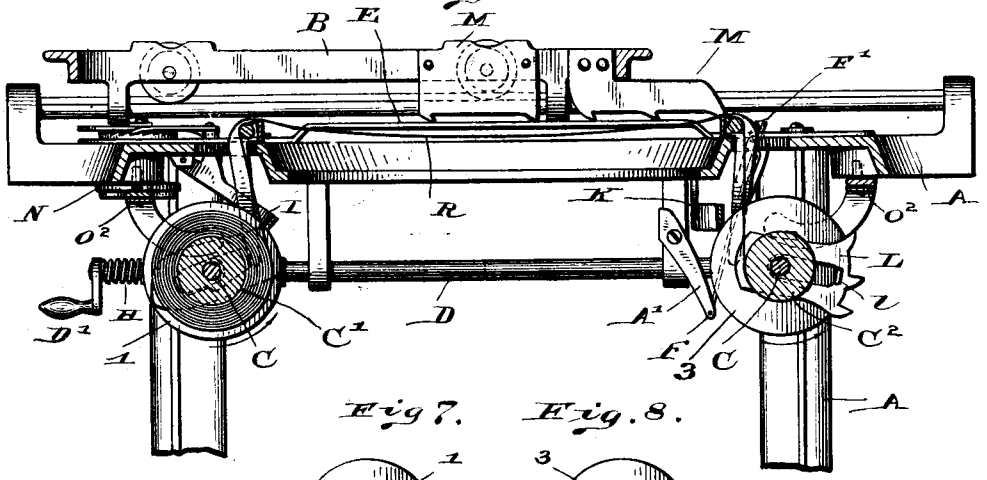


Fig 7.

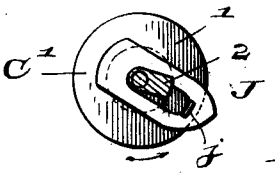
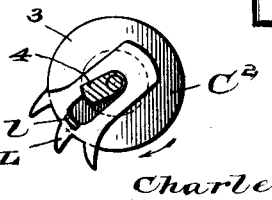


Fig. 8.



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(No Model.) 4 Sheets—Sheet 3.

C. E. JOHNSON.

RIBBON FEED REVERSING MECHANISM.

No. 546,067. Patented Sept. 10, 1895.

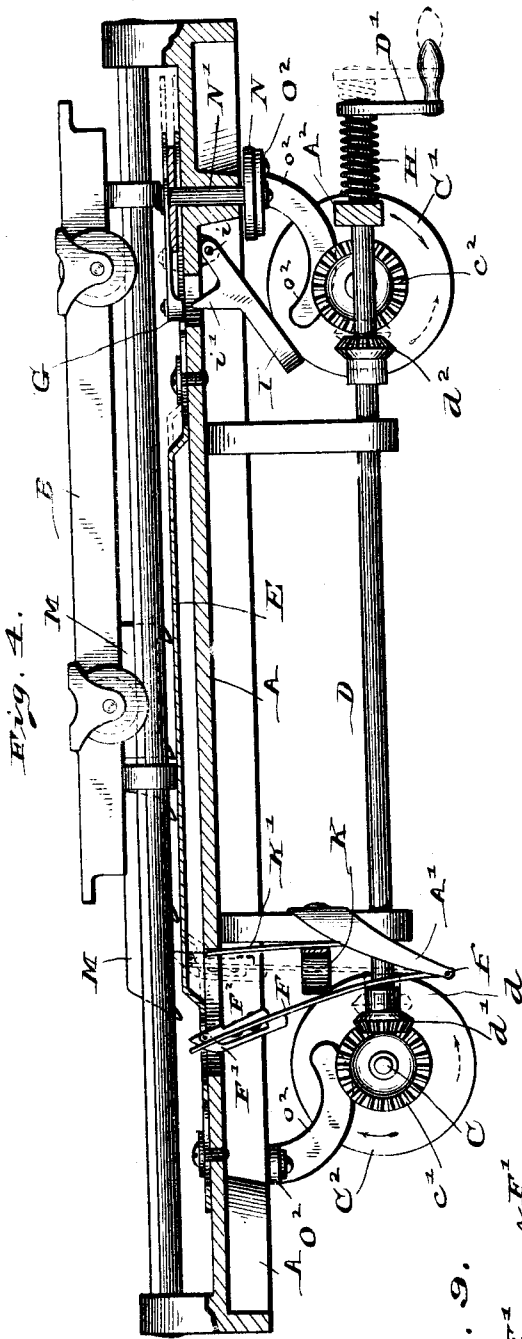


Fig. 4.

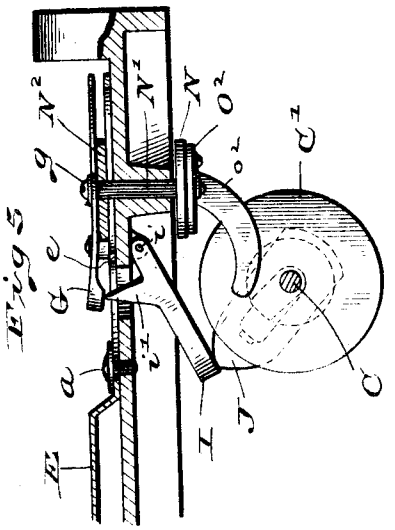


Fig. 5.

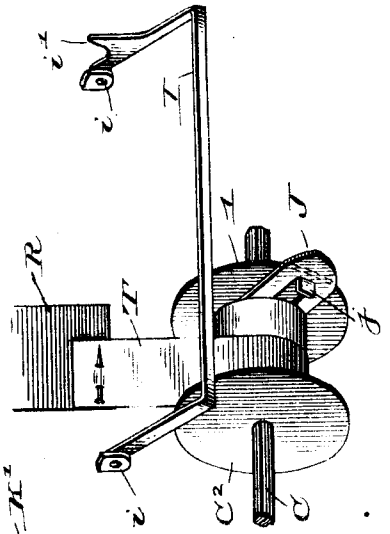
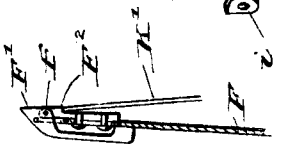


Fig. 6.



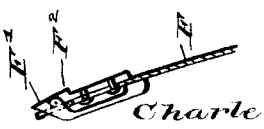


Fig. 9.

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RIBBON FEED REVERSING MECHANISM.

No. 546,067. Patented Sept. 10, 1895.

Fig. 10.

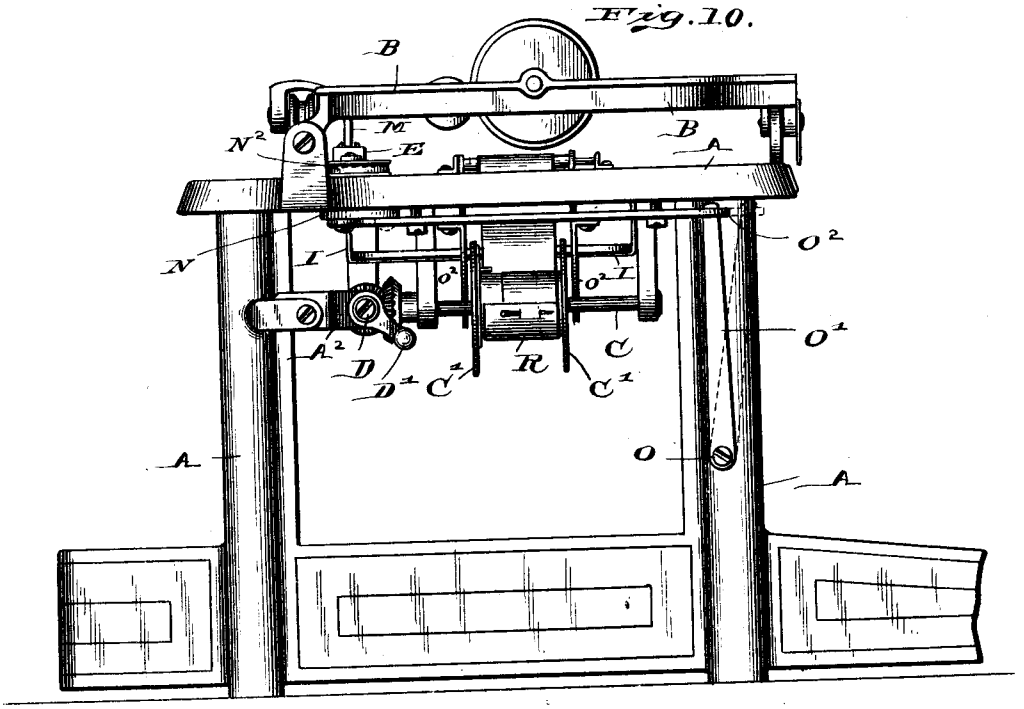


Fig. 11.

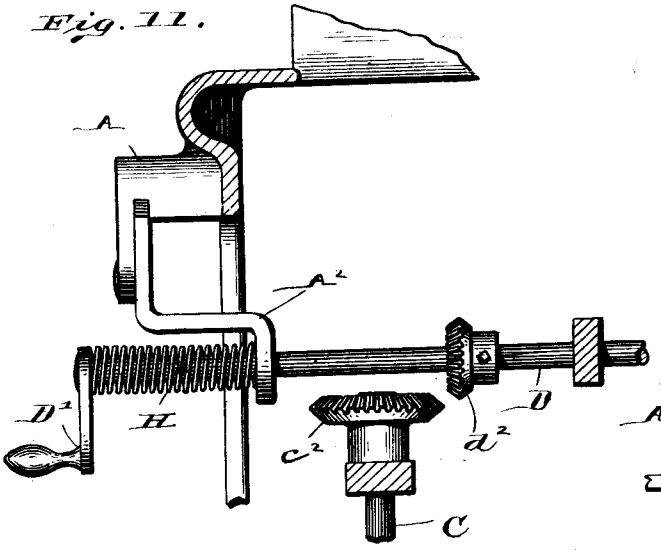


Fig. 13.

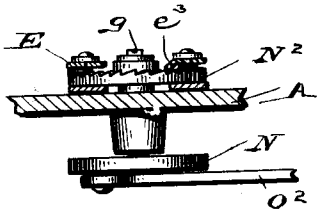
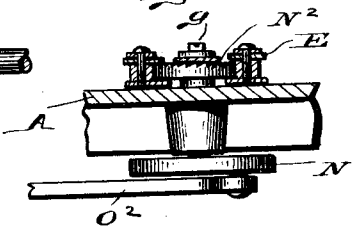


Fig. 14.



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UNITED STATES PATENT OFFICE.

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RIBBON-FEED-REVERSING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 546,067, dated September 10, 1895.

Application filed November 6, 1894. Serial No. 528,038. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. JOHNSON, a citizen of the United States, residing at Mount Jackson, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Ribbon-Feed-Reversing Mechanism, of which the following is a specification.

My present invention principally consists in an improved apparatus whereby the ribbon-feed in type-writing machines is reversed automatically each time the ribbon becomes unwound from one of its spools; and it further consists in combining therewith the transverse ribbon-feed attachment, so that it shall be operated from said automatic ribbon-feed-reversing mechanism.

While with certain structural modifications my invention is applicable to use with any type-writer of this general construction, I have selected for purposes of illustration the machine known as the "Remington." In the drawings, however, I have omitted much of the type-writer mechanism which is not especially related to my said invention; but in all cases the regular Remington construction may be understood.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a top or plan view of a type-writer provided with my improved apparatus, the position of the carriage thereon being indicated for the most part by means of dotted lines; Fig. 2, a horizontal sectional view immediately below the plate forming the upper part of the framework of the type-writer, the position of said plate being indicated by dotted lines; Fig. 3, a vertical longitudinal sectional view through the upper portion of the type-writer, as seen when looking upwardly from the dotted line 3 3 in Fig. 2; Fig. 4, a detail sectional view, on an enlarged scale, as seen from the rear side of the ribbon-feed shaft, the view being broken back at a central point to show the bar connecting the two ends of my apparatus and that portion of the frame to which it is connected in section; Fig. 5, a view substantially like Fig. 4, except that some of the parts are shown in a different position; Fig. 6, a perspective view of the lever by which the connecting-bar is released at one end of the spool and the attachments by which said release is effected; Figs. 7 and 8, detail views showing the form of the pawls on the spools, through which the releasing devices are operated; Fig. 9, sectional views illustrating two positions of the upper end of the lever at one end of the machine, forming part of the shifting mechanism; Fig. 10, an end elevation of a portion of the machine; Fig. 11, a detail horizontal sectional view similar in some respects to a portion of Fig. 2, but on a larger scale and taken at a little different point; Fig. 12, a top or plan view, on a larger scale, of one end of the shifting-bar shown in full in Fig. 1 and in its other position from that shown in Fig. 1; and Figs. 13 and 14, detail transverse sectional views, as seen from the dotted lines 13 13 and 14 14, respectively, in Fig. 12.

In said drawings, the portions marked A represent the framework; B, the traveling carriage; C, the ribbon-spool shafts; D, the shaft which drives the ribbon-spool shafts; E, a bar extending from end to end of the machine and connecting the shifting mechanism at the two ends; F, a lever by which the shaft D and bar E are moved in one direction; G, a detent by which said bar is held to the position to which it is moved by the lever F; H, a spring by which when the detent G is released the mechanism is moved to the other position; I, a lever by which the detent G is operated; J, a shifting pawl on one ribbon-spool by which the lever I is operated; K, a lever by which the catch on the upper end of the lever F is operated; L, a shifting pawl on the other ribbon-spool, by which the lever K is operated; M, an operating device attached to the traveling carriage, by which the lever F is operated at the appropriate time; N, a crank-wheel operated from the bar E, by which the mechanism for moving the ribbon transversely is automatically operated, and O the ordinary rock-shaft of said last-named mechanism.

The frame A and carriage B are among the parts which are or may be of the ordinary construction, as are also, in themselves, the shafts C and D, and the rock-shaft O and attached parts are also common to many type-

writing machines. Upon the shafts C are the ordinary spools C′ and C²; but arranged within the heads of said spools, as shown most plainly in Figs. 7 and 8, are the pawls J and L. The ribbon R runs from one spool to the other, as usual, and is of the ordinary width; but the tape T, as shown most plainly in Fig. 6, is narrower than the ribbon, leaving a portion of the spool exposed when the ribbon is unwound therefrom. The pawl J has a projection *j* and the pawl L has a projection *l*, and these projections extend out in position to be exposed when the ribbon is unwound and occupy a portion of the space left naked on the spool because of the narrowness of the tapes T. Thus said pawls are free to play back and forth when only the tape is on the spools, but are adapted to be forced in, so that the projections *j* and *l* will be close to the body of the spool when the tapes are wound up and the ribbon begins to wind. These pawls, which fall out when released by the unwinding of the ribbon and come in contact with the levers I and K, are the means by which the mechanism which causes the shifting to take place is operated, as will hereinafter be more fully described.

The bar E extends from end to end of the machine, just on top of the frame A and below the traveling carriage B. As a whole, it is best shown in Fig. 1, where it is shown as secured to the frame A by the attaching-screws *a a′*, passing through slots in said bar and entering said frame A. These attaching-screws are so adjusted that said bar E may slide freely back and forth on the frame a distance equal to the length of the shortest screw-slot in said bar. As shown in Fig. 1, at the right-hand end, the lever F extends up through a slot in said bar E and engages with notches in the sides of said slot, and thus as said lever is moved back and forth said bar is caused to move correspondingly. At the left-hand end the bar E is so constructed and provided with such attachments that it may operate the devices by which the ribbon is given its automatic transverse movement, as will be hereinafter particularly described, and at the same end is the projection *e*, extending into a continuation of the slot through which the attaching-screw *a* passes, with which the detent G will engage.

The lever F, as best shown in Figs. 1 and 4, is mounted on a pivot *f* in a downwardly-projecting bracket A′ on the frame A and is bifurcated and passes astride the shaft D just behind the collar or hub *d* thereon, and thus as said lever is moved toward that end of the machine nearest which it is situated, its operations are to force the shaft D longitudinally and the pinion *d′* thereon into engagement with the pinion *c′* on the adjacent spool-shaft C. As shown in Figs. 4 and 9, (particularly in the latter,) there is a shifting contact-point F′ mounted, by means of a pivot *f′* and a slide F², on the upper end of this lever F. The purpose of this is to enable the operating device M to either operate this lever or pass freely over it, according to circumstances—that is, when the parts F′ and F² are in their lower position, as shown in Fig. 4 and at the left of Fig. 9, the points of the device M will pass freely over it, and it will be permitted to remain quiet, notwithstanding the passage of said device; but when the parts F′ and F² are raised up, as shown by the dotted lines in Fig. 4 and at the right of Fig. 9, then the points of the device M come in contact therewith, and the lever is thereby pushed toward the end of the machine, carrying with it the shaft D and the bar E, said lever being in engagement with those parts, as previously stated. The part F′ is mounted on the pivot *f′*, so that it may be easily tilted by the device M on its return movement, if it should not have fallen back to its lower position by the time of such return movement. The bar E is held in the position to which it is forced by the lever F by the detent G, as will be presently described. The engaging or contact point F′ of this lever is raised into the path of the device M by the operation of the pawl L, acting through the lever K, as will be hereinafter more fully described.

The detent G is a spring-detent, and is so mounted within the slot in the bar E as to be held from lateral movement thereby, and it serves to engage with the projection *e* when the bar is in proper position and holds said bar to such position. It may be secured at any desired point; but I have found it convenient to secure it to the upper end of the shaft N′ in such a manner that while such shaft may revolve independently thereof it will hold said detent down to its work, as best illustrated in Figs. 4 and 5, said detent being held in place by a screw *g*, which enters a perforation in the upper end of said shaft. The operation is as the bar E is moved endwise by means of the lever F that this detent G will drop down behind the projection *e*, and thus hold said bar E to the position to which it has been thus moved, notwithstanding the tendency of the spring H, through the shaft D and lever F, to return it to the position from which it has been forced by the operating device M. The tapered or sloping character of the under side of this detent G near its extreme end permits the detent to be raised by the projection *e* as it passes under it in the direction in which it is forced by the lever F, while its outer end, being square or abrupt, engages with said projection *e* and thus effectively holds the bar E.

The spring H, as best shown in Figs. 4 and 11, surrounds the end of the shaft D and is secured between an arm A² on the frame A (which is secured to said frame A at the same point the catch for holding the bar D to a certain position has heretofore been located) and a hub or collar on said shaft, which may be the hub of the crank D′. The operation of this spring is to normally hold the shaft D into that position where the pinions *d²* *c²* will be in engagement, or, in other words, to act

reversely to the operation of the lever F when the device M comes in contact therewith. When the bar E is released by raising the detent G, said spring H will operate to throw the pinions d' c' out of engagement and the pinions d^2 c^2 into engagement. Said spring will, therefore, normally hold the parts to the positions indicated by dotted lines in Fig. 4, except when they are forced to the positions indicated by the full lines by the lever F and there held by the detent G.

The lever I is secured by the pivots i to suitable points on the under side of the upper portion of the frame A and has a projecting point i', arranged to raise the detent G out of engagement with the projection e on the bar E. Normally this lever I remains down in the position shown in the other drawings, free from contact with the detent G, but is operated upon occasion by the pawl J, at which times the detent G is forced upwardly, as shown in Fig. 5 and as above described.

The pawl J is mounted on the spool-shaft C just inside the head I on the spool C^2 thereon, and is slotted so as to move back and forth on said shaft. A flattened extension 2 on the inner surface of the spool-head 1 serves to prevent said pawl from revolving. The slot is notched on one side, as shown in Fig. 7, so that when the pawl moves outwardly it will be held there until the spool has made substantially a complete revolution, and thus the pawl is held firmly into that position which causes it to operate on the lever I until it has passed the point where its operation on said lever is effected, and which operation, as before stated, is to raise the lever I, and through it the detent G, thus releasing the bar E and permitting the spring H to operate. This shifts the engagement of the pinions on the shafts C and D, as above stated, and starts the ribbon R to travel in the reverse direction, and said ribbon coming presently into engagement with the projection j on the pawl J draws said pawl inwardly again, (it having by this time revolved to that point where it is free from the detent projection 2,) and said ribbon holds said pawl from falling out again until it has been wound up, and again unwound, when it is free to fall out to the position shown in Figs. 6 and 7, and the operation is repeated.

The lever K, as best shown in Figs. 2, 3, and 4, extends transversely across the machine, being pivoted at one end to the hanger A^3 on the under side of the upper portion of the frame A and extends thence across the ribbon spool C^2 at that end of the machine, passing close alongside the lever F, and is adapted to be operated upon occasion by the pawl L. Its office is to raise the sliding structure F' F^2 when it is itself raised by said pawl L, thus throwing the contact-point F' up into the path of the operating device M. A spring-detent K' serves to support the sliding structure F' F^2 in the position to which the lever K has raised it until the lever, including said structure, has been forced over by the device M, which pushes it clear of said detent K', when upon release of the pressure thereof said device F' F^2 will fall back to its lower position. The spring-detent K' is secured to the same portion of the frame A that the bracket A' is secured to, as shown most plainly in Fig. 4.

The pawl L in its general form and arrangement is similar to the pawl J, and is operated in a corresponding manner. It is shown as provided with three engaging-points instead of one, so that one of said points will be certain to engage with the lever K. A single point would usually be sufficient; but I have provided three for greater certainty. Said pawl is located just inside the head 3 on the spool C^2 and is held out at the proper point and for the proper time by the flattened extension 4 in the same way that the pawl J is held by the corresponding extension 2.

The operating device M on the traveling carriage B is similar in form and function to the corresponding device shown, described, and claimed in my Letters Patent No. 512,584, dated January 9, 1894, (wherein it is denominated an "abutment,") differing only in detail construction. Its office is to operate the lever F whenever its contact-point F' is projected up into the path of said device. This, as previously indicated, only occurs when the unwinding of the ribbon R has released the pawl L, so that the contact-point F' has been operated therefrom through the lever K. At other times this device M passes back and forth free of contact with any part of the mechanism.

The crank-wheel N is mounted on the lower end of the shaft N', upon the upper end of which, as shown most plainly in Figs. 5 and 12, is a ratchet-wheel N^2, which ratchet-wheel is adapted to be operated by the reciprocation of the bar F through a spring-pawl e^2, forming a part of the U-shaped structure E^2 secured thereon, the wheel N^2 being positioned between the bar E and the structure E^2, as is shown most plainly in Fig. 13. An edge e^3, forming a part of the same structure, serves as a detent and prevents the spring-pawl e^2 from pulling the ratchet-wheel N^2 back in its return movement, as will be readily understood by an examination of the drawings, especially Figs. 12 and 13. Said crank-wheel N is connected to and drives the mechanism by which the ribbon is given its transverse movement, and thus said mechanism is operated automatically instead of by hand, as has heretofore been usual.

The rock-shaft O is or may be identical with that common to the Remington type-writer, and is provided with the usual arms O', and these in turn are connected with the usual bars O^2, which are provided with arms o^2, by which the ribbon-spool is slipped back and forth on its shaft. At one end the bar O^2 is connected to the crank-wheel N, and is thus given its movement, as has already been de-

scribed. Otherwise this mechanism is of a usual form and arrangement, which is not peculiar to my invention, and being easily understood will not be further described herein.

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

1. The combination, in a ribbon feed reversing mechanism for typewriting machines, of the ribbon spools, the ribbon running between said spools, tapes immediately connected to said spools of a less width than the winding surface thereof, pawls mounted in said spools just inside the heads thereof and provided with projections which extend out over that portion of the winding surface of said spools left uncovered when the ribbon is unwound alongside the narrow tape thereon, and mechanism for shifting the ribbon feed adapted to be operated by said pawls when extended, whereby said mechanism is adapted to be operated when the ribbon is unwound at each end respectively, and prevented from being operated so long as any ribbon remains on said spools, substantially as set forth.

2. The combination, in a ribbon feed reversing mechanism for typewriting machines, of the ribbon-spool shafts, the ribbon spools thereon, a shaft extending between said ribbon-spool shafts and adapted to drive one or the other alternatively, a spring adapted to throw said ribbon spool shaft in one direction, a lever engaging with a hub or collar on said shaft and extending up into the path of an operating device on the traveling carriage, a sliding contact point on said lever, a second lever adapted to operate said sliding contact-point, and a pawl on the corresponding ribbon spool adapted to automatically move into position to operate said lever when the ribbon is unwound, substantially as set forth.

3. The combination, in a ribbon feed reversing mechanism for typewriting machines, of a lever for moving the shaft which operates the ribbon spools, a sliding contact point on said lever, mechanism for operating said sliding contact-point, and a spring detent K′ for supporting said sliding contact-point until moved by an appropriate operating device, and said operating device.

4. The combination, in an automatic ribbon feed reversing mechanism for typewriting machines, of the ribbon spools, the shaft extending between said ribbon spools and serving to operate them to run alternatively in opposite directions, a lever for moving said shaft in one direction, a spring for moving said shaft in the other direction, a bar extending longitudinally of the machine and adapted to be moved by said lever, a detent G at the other end of the machine from said lever, another lever positioned below said detent, and a pawl held out of engagement by the ribbon and released and permitted to drop into operative position when the ribbon is unwound for operating said lever and through it said detent, substantially as set forth.

5. The combination, in a ribbon-feed reversing mechanism for typewriting machines, of the shaft which extends between the ribbon spool shafts and by which they are alternatively driven, a lever engaging with said shaft and extending up toward the path of the carriage a movable contact point on said lever adapted to be thrown into the path of the carriage when the ribbon is unwound by which the first named shaft is moved longitudinally in one direction, a spring by which said shaft is moved longitudinally in the other direction, a sliding bar with which said lever is engaged, and a detent engaging with said bar whereby the mechanism will be held in the direction to which it has been operated by said lever until said detent is released.

6. The combination, with an automatic ribbon feed reversing mechanism for typewriting machines, and the mechanism for moving the ribbon spools transversely; of a reciprocating sliding bar operated from said ribbon feed reversing mechanism, a crank shaft mounted in the frame-work of the machine below one end of said bar and provided with a ratchet wheel on the upper end and a crank or wrist on the lower end, a pawl on said reciprocating bar, and a pitman connecting said crank to said mechanism for moving the ribbon spools transversely, said parts being arranged and operating substantially as set forth.

7. The combination, with an automatic ribbon feed reversing mechanism for typewriting machines, and the mechanism for moving the ribbon spools transversely; of the reciprocating bar E provided with the spring pawl e^2, the shaft N′ having the ratchet wheel N^2 on its upper end with which said pawl engages, and the crank or crank wheel N on its lower end, and the bar or pitman O^2 extending from said crank to said mechanism for moving the spools transversely, substantially as shown and described.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 1st day of November, A. D. 1894.

CHAS. E. JOHNSON. [L. S.]

Witnesses:

CHESTER BRADFORD,

JAMES A. WALSH.