W. J. BURCHETT.

RIBBON WINDING AND REVERSING MECHANISM.

APPLICATION FILED NOV. 21, 1913.

1,089,042.

Patented Mar. 3, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

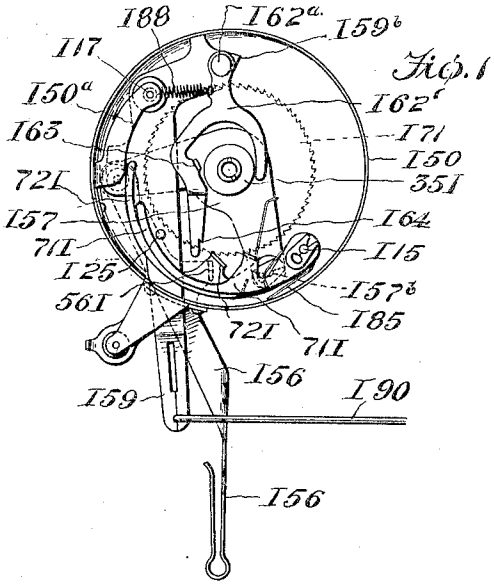


Fig. 2.

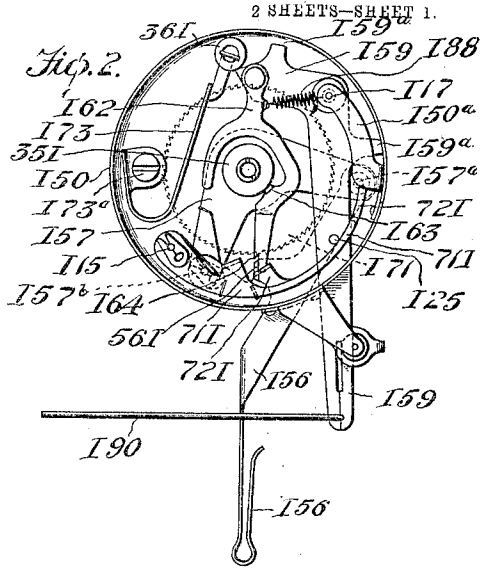


Fig. 3.

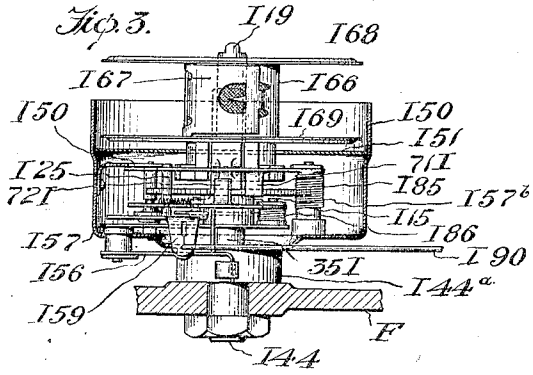


Fig. 4.

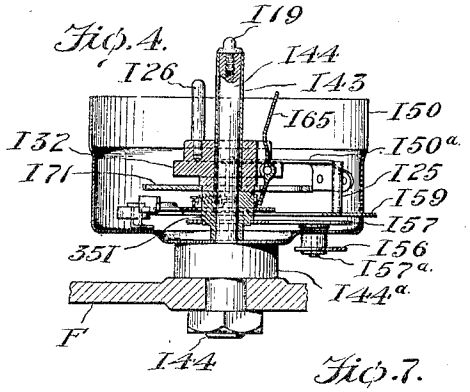


Fig. 5.

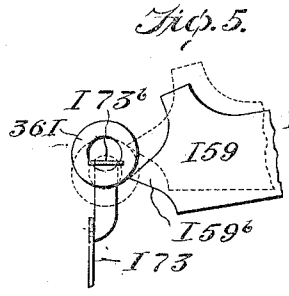


Fig. 6.

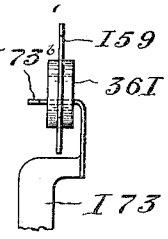


Fig. 7.

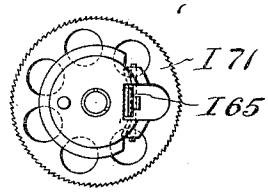
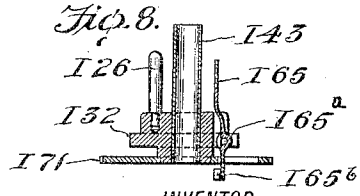


Fig. 8.



WITNESSES:

Paul M. Hunt

G. V. Lockwood

INVENTOR

Walter J. Burchett

BY

Geo. N. Hamilton

His ATTORNEY

W. J. BURCHETT.

RIBBON WINDING AND REVERSING MECHANISM.

APPLICATION FILED NOV. 21, 1913.

1,089,042.

Patented Mar. 3, 1914.

2 SHEETS—SHEET 2.

Fig. 9.

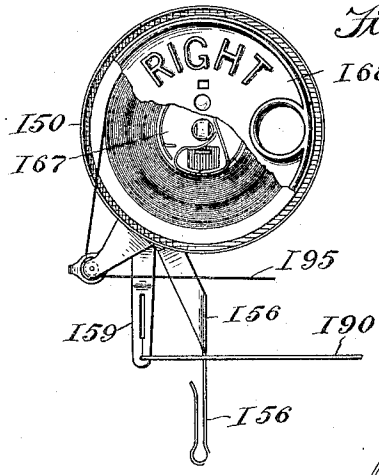


Fig. 10.

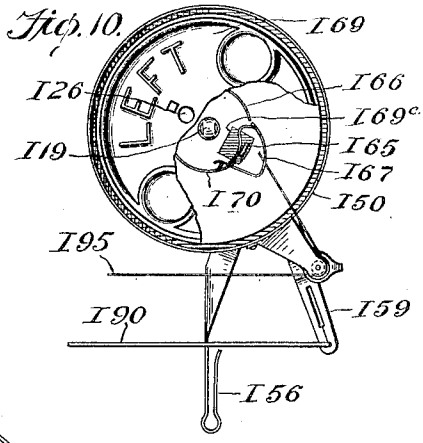


Fig. 11.

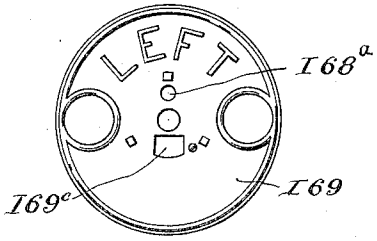


Fig. 12.

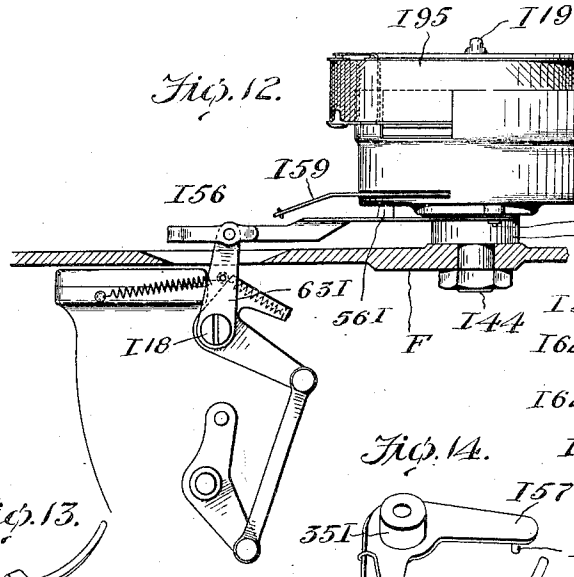


Fig. 15.

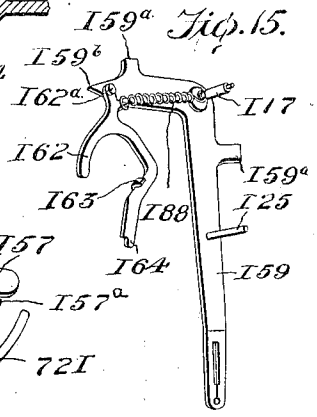
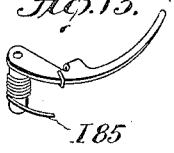


Fig. 14.

Fig. 13.



WITNESSES:

Paul M. Hunt.

S. B. Lockwood

INVENTOR

Walter J. Burchett

BY

Geo. H. Hamilton

his ATTORNEY

UNITED STATES PATENT OFFICE.

WALTER J. BURCHETT, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO ELLIS ADDING TYPEWRITER COMPANY, A CORPORATION OF NEW JERSEY.

RIBBON WINDING AND REVERSING MECHANISM.

1,089,042. Specification of Letters Patent. Patented Mar. 3, 1914.

Application filed November 21, 1913. Serial No. 802,282.

To all whom it may concern:

Be it known that I, WALTER J. BURCHETT, a citizen of the United States, residing at East Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Ribbon Winding and Reversing Mechanism, of which the following is a specification.

This invention relates to ribbon winding and reversing mechanism.

The present invention is an improvement on the ribbon winding and reversing mechanism set forth in the patent to Halcolm Ellis, No. 1018176, February 20, 1912. The device of the said Ellis Patent No. 1018176 contemplates the operation of the ribbon spools by clutching and unclutching them to spindles, both of which are constantly driven whether the spools be clutched or disconnected. In that mechanism the final unwinding of the ribbon trips the clutch controlling means and causes the previously unclutched ribbon spool to be clutched to its spindle.

The present invention has for its objects to dispense with the continuously driven spindles of the patented Ellis ribbon winding and reversing mechanism; to eliminate the clutch mechanism thereof; to simplify, make light and cheapen the construction and to render it more durable, less liable to derangement, and to practically eliminate possibility of inoperativeness of the automatic reversing of the feed.

The present invention, as with the Ellis ribbon winding and reversing mechanism, has for its object the provision of operating and reversing mechanism contained within the ribbon cup, thereby adapting the invention to any typewriting, adding or other printing machine employing a reversible ribbon.

In the present invention, the mechanism for rotating the ribbon spool is a loosely mounted pawl-and-ratchet wheel mechanism of improved construction located within the ribbon cup, being itself operated by such means as may be provided on the machine for actuation of ribbon mechanism. I thereby dispense with the rotary spindles employed in the patented Ellis construction and the necessity of providing driving gears therefor.

My invention also contemplates the provision of improved means operated by the swinging ribbon clamp on the ribbon spool for causing reversing, whereby the actuating pawl of the previously active ribbon spool is disengaged from its ratchet wheel and the previously inactive pawl-and-ratchet wheel of the idle or unwinding ribbon spool is thrown into engagement to cause reversal of the feed.

An object of the invention being the accomplishment of reversal without the offering of appreciable resistance to operation of the keys of the typewriter, adding machine or other mechanism, I provide a novel detent mechanism coöperating with the shifting or reversing mechanism which insures the retention of the shifting or reversing mechanism wherever positioned and which permits shifting of such mechanism without appreciable resistance being manifested to the depression of any key on the keyboard of the machine at the instant shifting and reversal occurs. This detent mechanism embodies a loosely mounted spring-pressed detent ring and a pin or tooth and is so constructed and arranged that it is practically impossible for the parts to get on a dead center and consequently, the action is both rapid, light and reliable.

An embodiment of the invention is set forth hereinafter, but as I am aware that modifications may be resorted to without changing any of the essential features, constructions falling within the spirit of the invention are to be considered as included within the scope of the claims hereto appended.

In the accompanying drawings:—Figure 1 is a plan view of the left-hand ribbon cup and its mechanism, the ratchet wheel and parts rotatable therewith, as also the ribbon spool and cover being removed, but the ratchet wheel being shown in dotted lines; Fig. 2, a similar view of the right-hand ribbon cup and its mechanism; Fig. 3, a vertical section through the left-hand ribbon cup, the operating parts being in full lines and the ribbon spool being shown; Fig. 4, a vertical section through the right-hand ribbon cup and the operating devices, the cover and ribbon spool being removed; Fig. 5, a detail plan view of the detent mechanism, dotted and full lines representing the two positions of the parts; Fig. 6, a detail side elevation of the detent mechanism; Fig. 7, a detail plan view of the mounting and rotating means for the ribbon spool; Fig. 8, a verti-

cal section thereof; Fig. 9, a plan view of the left-hand ribbon cup with the ribbon spool in position and the upper flange thereof partly broken away; Fig. 10, a similar view of the right-hand ribbon spool and its cup, the ribbon clamp being shown drawn out by the tension of the ribbon as when the spool has unwound and is ready to reverse; Fig. 11, a detail plan view of the ribbon spool; Fig. 12, a side elevation showing the machine frame in section and illustrating a means for operating the mechanisms of the ribbon spools. Fig. 13, a detail perspective of the check pawl and its spring; Fig. 14, a similar view of the bell crank, the actuating pawl and its spring; and Fig. 15, a similar view of a reversing lever and shifting dog.

The ribbon cups I50 are duplicates and each is considerably deeper than the width of the ribbon spool and has its side slightly constricted to provide a ledge to support a cover I51 which is adapted to lie above the operating and reversing mechanism, said cover being circular and provided with an opening in its center for the accommodation of the hub of the ribbon spool turning device.

The ribbon cups I50 are each secured to the upper face of a hub I44ª, forming part of a bolt I44 whose lower end passes through the frame F of the machine to which the mechanism is applied and is secured by a suitable nut. That part of the bolt I44 which projects upwardly within the ribbon cup serves as a spindle for the ribbon spool and its rotating device, described hereinafter.

Loose on the spindle I44 and resting on the bottom of cup I50 is a hub 35I. Secured to this hub is a bell-crank I57, on one arm of which is a pin I57ª. A lever I56 which is pivoted to this pin, receives an oscillating motion by the mechanism shown in Fig. 12, said mechanism consisting of a rocker 63I carried by a shaft I18 which extends across the machine, each lever I56 being operated by its own rocker 63I on shaft I18, so that the two levers I56 of the right and left-hand ribbon cups oscillate backward and forward in unison. Any suitable operating mechanism can be used to oscillate the shaft I18, one such mechanism being shown in Fig. 12 but forming no part of the present invention.

The levers I56 each have an upwardly projecting tooth 56I (Figs. 1, 2 and 12). The remaining arm of the bell-crank lever I57 carries a pin I57ᵇ to which a feed pawl 72I is pivoted, a spring I86 pressing the pawl inwardly. A check pawl 71I which is mounted on a pivot I15 secured to the bottom of the cup I50, is pressed inwardly by a coil spring I85 surrounding this pivot. The pawls 71I and 72I have curved tails or extensions. Each ribbon mechanism has a reversing lever I59 provided with a pivot pin I17 which is mounted in the bottom of the ribbon cup I50 and in a bracket I50ª carried by the side wall thereof. The two reversing levers are connected together by a rod I90 so that they will move in unison. These levers are of bell-crank shape, the longer arm of each extending through a slot in the side of the ribbon cup. Each has lugs I59ª adapted to strike the inside wall of the cup and limit its play.

To the short arm of the lever I59 is pivoted, at I62ª, a bifurcated shifting dog I62 whose legs loosely straddle the hub 35I and whose movements are limited therebv, the dog being shiftable to a limited extent. A spring I88 tends to keep the dog in the position shown in Fig. 1, which is the normal position, as when the ribbon is unwinding from that cup, as shown in Fig. 9. The dog has an upright lug I63 and also a notch I64 which is adapted to receive the tooth 56I on the oscillating ribbon feed arm I56 when the ribbon has unwound and the dog I62 is moved by the tension of the ribbon as will presently appear.

The reversing lever has a vertical check pin I25 against which the curved tails of the pawls 71I and 72I bear, by which their location in feeding or non-feeding position is controlled, according as the reversing lever is in the position shown in Fig. 1 or that of Fig. 2.

Referring to Figs. 2, 5 and 6, the short arm of the reversing lever has a pin or tooth I59ᵇ. Secured to the ribbon cup by a screw or fastening I73ª is a spring arm I73 which has an upwardly bent thin, flat part I73ᵇ whose upper end is widened into a retaining head. A ring or roller detent 36I loosely encircles the part I73ᵇ and is prevented from slipping off therefrom by the head aforesaid. The looseness of the mounting of the detent 36I permits it to shift as shown by dotted lines, Fig. 5, as the tooth I59ᵇ moves with the lever I59. When the tooth I59ᵇ shifts, its pressure against the outer face of the detent 36I is opposed by the spring I73 and is applied solely to the point (practically a knife edge) where the edge of the part I73ᵇ bears against the inner face of the ring detent. Consequently, it is practically impossible to get the parts on a dead center, as the detent 36I having circular outer and inner faces, flops to the full line or dotted line position, Fig. 5, with the slightest possible vibration of the machine. In the actual operation of the machine, the resistance offered to shifting of the reverse levers is so slight that no difference in resistance can be detected in the touch of a typewriting key when the ribbon is feeding or when it reverses.

Referring to Figs. 4, 7 and 8, I32 desig-

nates a hub, to the lower end of which is secured a ratchet wheel I71. Extending through the hub and suitably secured thereto is a split sleeve I43. The sleeve, hub and ratchet wheel are rotatable on the spindle I44, the lower face of the hub resting upon the upper face of hub 35I. A small cap screw I19 threaded into the upper end of spindle I44, overlaps the upper edge of sleeve I43 and retains it on said spindle. A pin I26 carried by the hub I32, is adapted to enter a hole I68[a] in the ribbon spool. The ribbon spool is composed of two disks I68 marked "Right" and I69 marked "Left" connected by a cylindrical core I66 (Fig. 3). The core I66 has a gap which is completed by a pivoted ribbon clamp or fastener I67, appearing in Figs. 3, 9 and 10, having a prong or point for the attachment of the ribbon I95. When winding on the spools, the ribbon draws the clamp or fastener I67 closed and winds around it (Fig. 9), but when the spool is entirely unwound, the tension of the ribbon I95 swings the clamp or fastener outward to the position shown in Fig. 10, which action is utilized to reverse the operating mechanism so that the ribbon will wind on the previously unwound spool.

Pivoted on a pin I65[a] carried by hub I32 is a vertically disposed trip lever I65 (Figs. 4, 7 and 8) which has a curved lower end I65[b]. The upper end of the lever I65 projects loosely through an opening I69[c] in one of the heads I68 or I69, as the case may be, and into the open part of the ribbon clamp or fastener I67 in position for engagement thereby.

When the ribbon is wound on the spool, as in Fig. 9, it holds the fastener closed and the lower end I65[a] of the lever is then free from tooth or lug I63 on dog I62, and consequently, the dog I62 remains in the position shown in Fig. 1 by the action of spring I88 and is not in position for its notch I64 to receive the lug or tooth 56I. The oscillation of the lever I56, therefore, has no effect on the dog I62 or the reversing mechanism of the ribbon cup, whose spool is unwinding; nor is there any cooperation between the other lever I56 and the dog I62 and reversing mechanism of the spool on which the ribbon is being wound. During the continuance of such conditions, the let-out ribbon spool is free from its pawls and turns idly, but the wind-up spool is turned, step by step, by the rocking of lever I57, due to the action of lever I56 and the engagement of feed pawl 72I with ratchet wheel I71, whose reverse movement is checked by its check pawl. When the let-out ribbon spool has completely unwound, the tension of ribbon I90 pulls the clamp I67 out, as shown in Fig. 10, which then forces the trip lever I65 to the position shown in Fig. 4, and its curved lower end I65[b] comes into contact with the tooth or lug I63, forcing the dog I62 to the position shown in Fig. 2. When the dog is thus positioned, its notch I64 is in line to receive the lug 56I on lever I56 and on the next oscillation of said lever, the dog I62 is forced back, rocking the reversing lever I59, whose point I59[b] then snaps past the detent 36I, the lever I59 finally assuming the position corresponding to that shown in Fig. 1, with lugs I59[a] abutting the wall of the ribbon cup. This movement of the reversing lever of the cup having the unwound ribbon spool, causes the reversing lever I59 of the other ribbon cup to be shifted through the medium of rod I90 and the previously idle actuating ratchet wheel of the unwound spool to be engaged by its pawl because the shifting of lever I59 moves the pin I25 (Fig. 2) away from the curved tails of the pawls and allows their springs to press them into engagement with the ratchet wheel, ready to cause winding of the ribbon on the previously unwound spool. The previously wound spool now turns idly because the pawls of the actuating ratchet wheel thereof which were theretofore engaged with said ratchet wheel, are now freed therefrom by the engagement of the pin I25 of that mechanism with the tails of said pawls when the reversing lever of that mechanism is shifted. Thus, when one set of pawls is engaged with the ratchet wheel of one ribbon cup, the set of pawls of the other cup is free from its ratchet wheel.

The detent mechanism shown in Figs. 2, 5 and 6 causes a reliable snap action when the mechanisms reverse and offers such slight resistance that it is not noticeable in the key touch when reversal takes place.

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

1. In a ribbon winding and reversing mechanism, the combination with ribbon reels or spools, of independent rotating devices therefor coupled to the said spools and thereby adapted to turn with the spools whether the latter are reeling or unreeling the ribbon, means for turning said rotating devices, coupled reversing means controlling the coöperation of the turning means with the rotating devices, and means operated by the ribbon, when unwound, adapted to cooperate with the reversing means to cause the reversing means to coöperate with the turning means aforesaid, whereby on the unwinding of the ribbon, the reversing means is shifted to reverse the coöperation of the ribbon turning means with the rotating devices aforesaid.

2. In a ribbon winding and reversing mechanism, the combination with ribbon reels or spools, of independent rotating de-

vices therefor coupled to the said spools and thereby adapted to turn with the spools whether the latter are reeling or unreeling the ribbon, means for turning said rotating devices, coupled reversing levers, a shifting dog for each lever, said shifting dogs and levers controlling the coöperation of the turning means with the rotating devices aforesaid, means operated by the ribbon, when unwound, adapted to coöperate with the shifting dogs aforesaid to thereby control the coöperation of the reversing levers with the turning means aforesaid, whereby when the ribbon is unwound, the turning means shifts the dog and reversing lever of the unwound reel or spool and causes the turning means to coöperate with the rotating device of that reel or spool.

3. In a ribbon winding and reversing mechanism, the combination with ribbon reels or spools, of independent ratchet wheels coupled to said spools and thereby adapted to turn with the spools whether the latter are reeling or unreeling the ribbon, an operating pawl for each of the ratchet wheels which is disengageable therefrom, independent, coupled reversing levers having means coöperating with the respective pawl, whereby the pawl of one ratchet wheel is freed from said ratchet wheel when the pawl of the other ratchet wheel is engaged with its ratchet wheel, ribbon reel turning means for operating the pawls, and means operated by the ribbon, when unwound, adapted to effect coöperation between the reversing levers and the ribbon reel turning means, whereby the ribbon reel turning means shifts the reversing levers to reverse the previously existing arrangement of the pawls.

4. In a ribbon winding and reversing mechanism, the combination with ribbon reels or spools, of independent ratchet wheels coupled to said spools and thereby adapted to turn with the spools whether the latter are reeling or unreeling the ribbon, an operating pawl for each of the ratchet wheels which is disengageable therefrom, a pawl operating device, independent, coupled reversing levers, shifting spring-actuated dogs pivoted to the respective reversing levers and adapted for engagement by the pawl operating device aforesaid when said dogs are in a predetermined position, and means operated by the ribbon, when unwound, adapted to coöperate with the dog of the unwound reel or spool to thereby position it for coöperation with the pawl operating device, said reversing levers having means coöperating with the pawls, whereby a pawl is held out of engagement with the ratchet wheel of the ribbon spool from which the ribbon is unreeling.

5. In a ribbon winding and reversing mechanism, the combination with ribbon reels or spools, of independent rotating devices therefor coupled to the said spools and thereby adapted to turn with the spools whether the latter are reeling or unreeling the ribbon, trip levers carried by the rotating devices, means operated by the ribbon, when unwound, adapted to shift the trip lever of the unwound reel, means for turning the rotating devices aforesaid, and reversing means positioned by the movement of the trip lever so as to be adapted to coöperate with the turning means aforesaid, whereby the said reversing means is thereupon operated.

6. In a ribbon winding and reversing mechanism, the combination with ribbon reels or spools, of independent rotating devices therefor coupled to the said spools and thereby adapted to turn with the spools whether the latter are reeling or unreeling the ribbon, trip levers carried by the rotating devices, means operated by the ribbon, when unwound, adapted to shift the trip lever of the unwound reel, means for turning the rotating devices aforesaid, reversing levers for the respective ribbon reel mechanisms, and shifting spring-actuated dogs pivoted to said reversing levers and adapted, when moved by the trip levers aforesaid, to be positioned for engagement by the turning means aforesaid, whereby when the ribbon is unwound reversal of coöperation of the turning means with the rotating devices is accomplished.

7. In a ribbon winding and reversing mechanism, the combination with ribbon reels or spools, of independent ratchet wheels coupled to said spools and thereby adapted to turn with the spools whether the latter are reeling or unreeling the ribbon, a trip lever movable with each ratchet wheel, operating and check pawls for the respective ratchet wheels, means for moving the operating pawls, reversing levers having means coöperating with both the check and operating pawls, a coupling connecting the reversing levers, spring-actuated shifting dogs pivoted to the reversing levers and adapted to be engaged by the trip levers aforesaid and when so engaged to be arranged for coöperation with the pawl actuating means aforesaid, and means operated by the ribbon, when unwound, adapted to move the trip lever of the unwound reel, whereby when the ribbon unwinds, the shifting dog of the unwound reel is actuated by the pawl operating means and the reversing levers are shifted to cause rewinding on the unwound reel.

8. In a ribbon winding and reversing mechanism, the combination with a shiftable reversing member having a point or tooth, of a support, a spring-actuated circular detent loosely carried by said support and adapted for bodily shifting thereon and coöperating with said point or tooth.

9. In a ribbon winding and reversing mechanism, the combination with a shiftable reversing member having a point or tooth, of a spring-actuated bodily shiftable detent ring whose outer periphery bears against the tooth or point aforesaid and whose inner circular surface is loosely mounted on its spring-actuated support.

10. In a ribbon winding and reversing mechanism, the combination with a shiftable reversing member having a point or tooth, of a spring-actuated support having a relatively thin edge, and a detent ring whose inner circular surface bears loosely and shiftably against the thin edge aforesaid and whose outer periphery, is engaged with the point or tooth of the reversing member.

11. In a ribbon winding and reversing mechanism, the combination with a shiftable reversing member having a point or tooth, of a spring arm, and an exteriorly circular detent having a loose shiftable connection with said arm, whereby it may shift in relation to the arm as well as move bodily with said arm, the periphery of said detent bearing against said point or tooth.

12. In a ribbon winding and reversing mechanism, the combination with a ratchet wheel for turning the ribbon reel or spool, of an operating pawl therefor, pawl-operating means, a reversing lever, settable means coöperating with the reversing lever and the pawl-operating means, whereby the reversing lever may be shifted, and means for causing coöperation of the reversing lever with the pawl.

13. In a ribbon winding and reversing mechanism, the combination with a ratchet wheel for turning the ribbon reel or spool, of an operating pawl therefor and a check pawl for said ratchet wheel, pawl operating means, a reversing lever, settable means cooperating with the reversing lever and the pawl-operating means, whereby the reversing lever may be shifted, and means for causing coöperation of the reversing lever with the pawls.

14. In a ribbon winding and reversing mechanism, the combination with a ratchet wheel for turning the ribbon reel or spool, of an actuating pawl therefor, pawl-operating means, a reversing lever, a spring-actuated settable dog operated by the reversing lever and adapted to be positioned for engagement by the pawl-operating means, and means for causing coöperation of the reversing lever and the pawl.

15. In a ribbon winding and reversing mechanism, the combination with a ribbon reel or spool, of a ratchet wheel for turning said reel or spool, a pawl adapted to engage the ratchet wheel, pawl-operating means, a reversing lever, a shifting dog, and a trip lever adapted for actuation when the ribbon is unwound from the reel and to set the dog for coöperation with the pawl-operating means, said reversing lever and pawl being adapted for coöperation.

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

WALTER J. BURCHETT.

Witnesses:

HALCOLM ELLIS,

LEANDER J. WHITMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."