B. W. SCOTT.

AUTOMATICALLY REVERSIBLE INK RIBBON FEEDING MECHANISM.

APPLICATION FILED MAY 25, 1906.

917,803. Patented Apr. 13, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

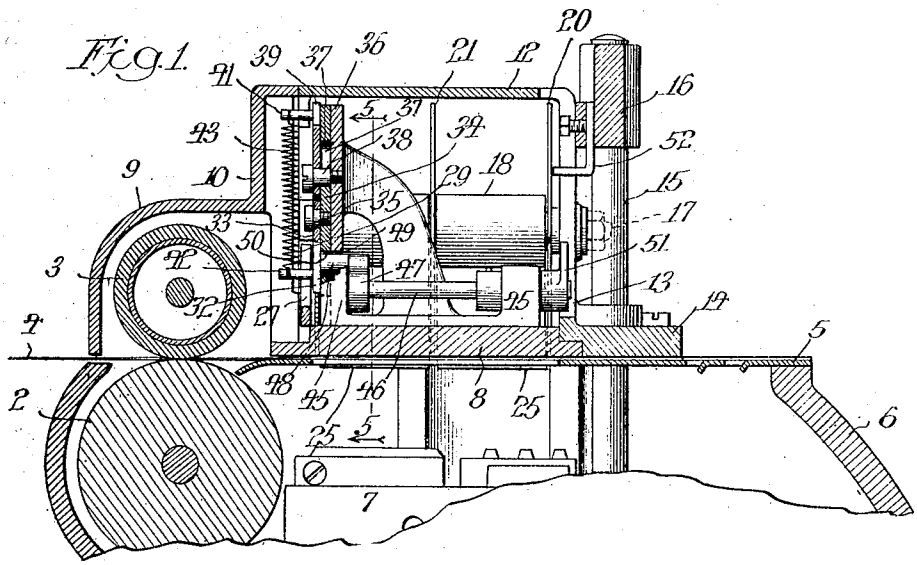
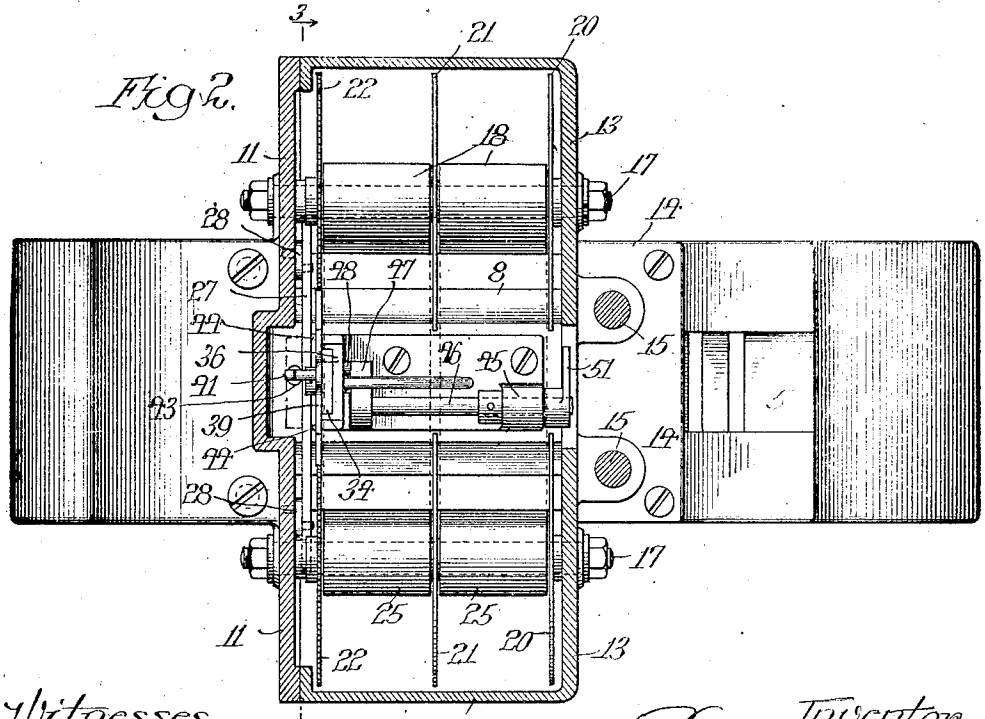


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

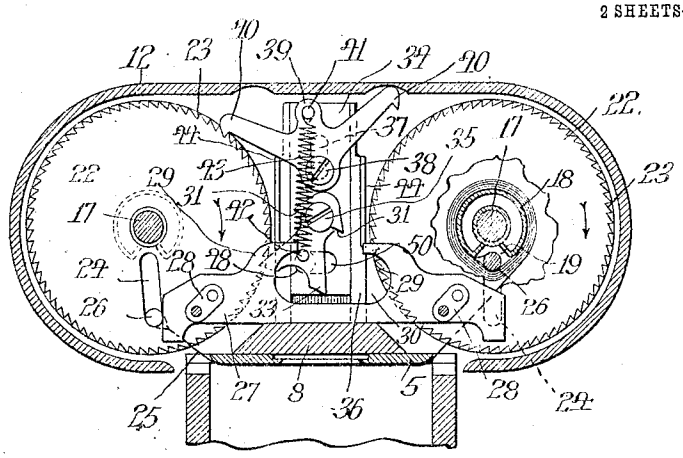


Fig. 4.

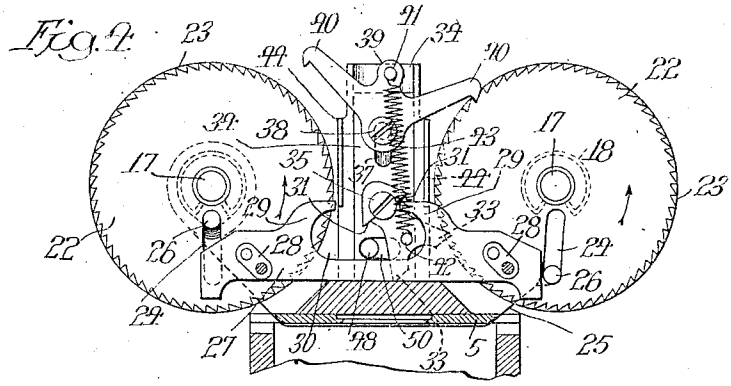
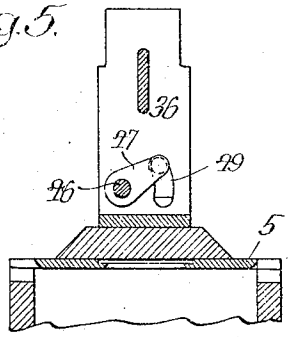


Fig. 5.



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UNITED STATES PATENT OFFICE.

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AUTOMATICALLY-REVERSIBLE INK-RIBBON-FEEDING MECHANISM.

No. 917,803. Specification of Letters Patent. Patented April 13, 1909.

Application filed May 25, 1906. Serial No. 318,649.

To all whom it may concern:

Be it known that I, BURTON W. SCOTT, a citizen of the United States, residing at Detroit, in the State of Michigan, have invented certain new and useful Improvements in Automatically - Reversible Ink - Ribbon-Feeding Mechanism, of which the following is a description, reference being had to the accompanying drawings, forming a part of this specification.

The object of the present invention is to provide reliable means in ticket or other printing or stamping machines for shifting an inking ribbon step by step with each operation of the machine until such ribbon is unwound from one spool or reel and wound upon another and to then automatically reverse the operation so that the ribbon will be moved step by step in the opposite direction, unwinding from the last-mentioned spool or reel and being wound upon the first-mentioned spool or reel.

It is also the object of the invention to provide for ease of operation in making the reversal so that no undue strain will come upon the ribbon.

With these and incidental objects in view the invention consists in certain novel features of construction and combinations of parts, the essential elements whereof are recited in the appended claims and a preferred form of embodiment of which is described in detail hereinafter and fully illustrated in the accompanying drawings.

Of said drawings Figure 1 represents in longitudinal section the upper part of a ticket printing machine with the present invention embodied therein; Fig. 2 represents a top plan view of the same with the casing in horizontal section; Fig. 3 represents a cross-section taken on the line 3—3 of Fig. 2 and looking in the direction of the arrows crossing said line; Fig. 4 is a similar view to Fig. 3 but with the parts differently adjusted; and Fig. 5 is a section taken on the line 5—5 of Fig. 1 looking in the direction of the arrows crossing said line.

The reference numerals 2 and 3 designate feed-rollers by which a strip of paper 4 is fed over a guide-plate 5 which surmounts a suitable casing 6 containing type carriers 7 reciprocated through suitable means not shown. Above the guide-plate 5 over a suitable opening therein is mounted a platen-block 8 and the latter constitutes the base of a frame supporting the ribbon mechanism. A housing 9 for the upper feed-roller 3 is preferably cast integral with said platen-block 8, this housing having a central upstanding portion 10 within which parts of the ribbon feeding mechanism are accommodated and said housing is also formed with lateral wings 11 (Fig. 2) forming with the housing proper part of the casing which incloses the ribbon mechanism. Another housing completes this casing, the same comprising a cap portion 12 suitably secured to the wings 11, and vertical portions 13 which rise from a block 14 which fits the platen-block 8 and is bolted to the main casing 6. This block 14 provides guides for plunger rods 15 connected at their upper ends by a cross-head 16 and reciprocated through suitable means not shown.

The wings 11 and the vertical portions 13 of the two housings which compose the upper casing, support between them journal rods 17 upon which are mounted to rotate the ribbon-carrying spools or reels. Each of the latter comprise a hub 18 with an axially extending recess 19, and disks 20, 21 and 22. This construction divides the reel or spool so that two ribbons can be accommodated, one being confined between the central disk 21 and one outer disk 20 and the other being confined between said central disk and the other outer disk 22. The disks 22 are each formed with ratchet peripheries 23, the ratchet teeth of one disk pointing oppositely to those of the other. The three disks of each spool or reel are formed with sliding radial slots 24 which extend into the hub recesses 19. The two inking ribbons 25 are secured at their opposite ends to rods 26 which occupy said slots and are radially movable therein.

When the ribbons are wound upon either spool or reel the rod of that spool will enter the hub recess thereof as shown in Fig. 3 at the right-hand side. When the ribbons are completely unwound from either spool the rod 26 leaves the hub recess and travels to the outer ends of the slots 24 as shown at the left-hand side of Fig. 3. The arrangement is such that when the ribbons are unwound from the spool the radial slots assume a substantially vertical position so that as the spool turns to bring the slots to such position the rod will tend to move outwardly from the

center of the spool both by gravity and by the draft of the ribbons, the latter extending down under the guide-plate 5. On the other hand when the spool turns in the opposite direction to wind the ribbons thereon, the rod will be drawn inwardly as the slots approach the horizontal and will enter the hub recess as the ribbons wind about the hub. These rods are employed as means for reversing the ribbon feed through the medium of a bar 27 lying along the outer sides of the disks 22 just above the base block 8 and connected by radius links 28 with the casing wings 11 so that the bar may move easily to and fro in the direction of its length. The ends of said bar form abutments for the rods 26 where the latter project beyond the ratchet disks 22. The bar is so proportioned and positioned with reference to the spools that as the ribbons unwind from either spool and the rod 26 of that spool moves outwardly in the slots 24, this rod crosses one end of the bar so that in the continued turning of the spool the rod will be carried against this end of the bar and the latter will be shifted. At this time the rod 26 of the other spool is of course lying in the hub recess of that spool entirely out of the path of the other end of the bar. The latter constitutes a double-acting tappet-piece being formed at its upper part with confronting projections or horns 29 separated as to their confronting ends by a considerable space and overhanging a reëntrant opening 30 in the bar. The confronting end portions of the projections or horns 29 are designed to come alternately into the paths of movement of radial shoulders 31 on opposite sides of the pivot of a double acting pawl 32. This pawl has separate acting ends 33 for the two ratchets 23 between which it is positioned, said acting ends being somewhat divergent so as to secure the proper coöperation between the pawl and either ratchet. The pawl is pivotally attached to a vertical slide 34 by means of a screw-stud 35 and when tilted one way engages one of the ratchets as shown in Fig. 3 and when tilted the opposite way engages the other ratchet as shown in Fig. 4.

The vertical slide 34 fits a suitable guide-way in an upright 36, forming part of the frame-work erected on the platen-block 8. The slide 34 is longitudinally slotted at 37 and a screw-stud 38 secured in the upright 36 passes through said slot and constitutes a pivot for a double-acting restraining pawl 39, this screw also serving the purpose of confining the slide in its guide-way. The said restraining pawl has two branches 40 diverging from each other and formed to engage the ratchets 23 for the purpose of preventing backward movement of the spool or reel upon which the ribbons are being wound. In a median line of the restraining pawl at a point above its pivot there projects a pin 41 and in a median line of the actuating pawl 32 at a point below its pivot there projects a similar pin 42. A spiral spring 43 connects these two pins and performs the function of holding the pawls yieldingly engaged with either ratchet disk and also the function of reversing the restraining pawl by the reversal of the actuating pawl. In the latter operation the spiral spring is caused to cross over from one side of the pivots of both pawls to the opposite side and consequently will thereupon operate to draw the restraining pawl into engagement with one or the other of the ratchet disks according to which way the actuating pawl has been tilted. Furthermore, the spring assists in reversing the latter pawl as soon as said spring has passed across the pivotal center thereof. The tilting movements of the two pawls under the influence of this spring are limited by abutments on the upright 36 (Fig. 5) provided by the ends of flanges 44. The spring 43 in addition to its other functions above enumerated constitutes the means for raising the slide 34 to the limit of its upward movement as determined by the abutment of the lower end of the slot 37 against the screw-stud 38.

The frame-work of which the upright 36 forms a part is provided on its base with bearings 45 for a horizontally extending rock-shaft 46 which has a crank-arm 47 at one end and a wrist-pin 48 thereon passing through an arc-shaped slot 49 in said upright 36 and entering a transverse slot 50 in the slide 34. The opposite end of the shaft 46 is provided with a tappet-arm 51 projecting in the path of a tappet-finger 52 secured to the cross-head 16. It will be seen that reciprocations of the cross-head 16 will produce reciprocations of the slide 34 for the tappet-finger 53 operates through the tappet-arm 51, rock-shaft 46, crank-arm 47 and wrist-pin 48 to depress said slide when the cross-head moves down and then when said cross-head rises the spring 43 draws the said slide to its upper position. With the actuating pawl 32 engaging the ratcheted periphery 23 of one of the disks 22 this reciprocation of the slide will have the effect of turning said disk and the reel of which it forms a part, step by step, causing the inking ribbons 25 to be wound thereon.

In the operation of the above described devices the step by step winding of the ribbons upon a spool or reel continues until their ribbons have been unwound from the other spool or reel whereupon the rod 26 which anchors the ends of the ribbons moves outwardly through the slots 24 in the manner hereinbefore described and, taking up a position in front of one end of the bar 27, then acts against said bar and shifts it to a position in which one of the projections or horns 29 of said bar extends in the path of

the lowered shoulder 31 of the actuating pawl 32. In the next downward movement of the slide 34 this shoulder of the pawl will abut said projection or horn of the bar and thereby the pawl will be tilted on its pivot in the manner illustrated in Fig. 4 so that the spring 43 will cross the central line and the pawl will be drawn into engagement with the ratchet of the reel or spool from which the ribbon has been unwound. At the same time the restraining pawl is shifted from its engagement with the ratchet of the one spool or reel to the ratchet of the other spool or reel in the manner hereinbefore described. The succeeding reciprocations of the slide 34 will then cause step by step rotation of the spool or reel from which the ribbons have been unwound so that they will be rewound upon the same.

It will be seen that the construction above described is well calculated to thoroughly fulfil the objects primarily stated. At the same time this particular construction is susceptible of various modifications and the invention is not limited to the details thereof so that in the following claims essential elements are recited without such limitations.

What is claimed is:

1. The combination with ribbon-carrying reels having opposed ratchet wheels, of a reciprocating pawl adjustable to coöperate with either ratchet wheel, and means for automatically changing the adjustment of the pawl directly through its own reciprocating movement by the running out of the ribbon; substantially as described.

2. The combination with ribbon-carrying reels having opposed ratchet wheels, of a reciprocating pawl adjustable to coöperate with either ratchet wheel, and means for automatically changing the adjustment of the pawl directly through its own reciprocating movement by the running out of the ribbon comprising provisions for automatically varying the points of attachment of the ribbon to the reels radially thereof.

3. The combination of reels having opposed ratchet wheels, a ribbon extending between said reels, anchors for the ends of said ribbon radially movable in the reels, a reversible reciprocating pawl for alternately engaging said ratchets, and means operated by the ribbon anchors for automatically reversing the pawl directly through the latter's own reciprocating movement.

4. The combination of radially slotted reels, having opposed ratchet wheels, a ribbon extending between said reels, anchors for the ribbon ends slidable in the radial slots of the reels, a reversible reciprocating pawl for alternately engaging said ratchets, and means operated by the ribbon anchors for automatically reversing the pawl directly through the latter's own reciprocating movement.

5. The combination of radially slotted and hub-recessed reels having opposed ratchet wheels, a ribbon extending between the reels, anchors for the ribbon ends adapted to engage the hub recesses of the reels and slidable in the radial slots thereof, a reversible reciprocating pawl for alternately engaging said ratchets, and means operated by the ribbon anchors for automatically reversing the pawl directly through the latter's own reciprocating movement.

6. The combination of reels having opposed ratchets, rods carried by said reels and radially movable with reference thereto, a ribbon secured at its ends to said rods, a reversible reciprocating pawl for alternately engaging said ratchet wheels, and means actuated by said ribbon rods for automatically reversing the pawl directly through the latter's own reciprocating movement.

7. The combination of reels having opposed ratchet wheels, a ribbon extending between said reels, anchors for the ends of said ribbon radially movable in the reels, a reversible reciprocating pawl for alternately engaging said ratchets, and a reciprocating pawl shifter operated by said anchors to present said shifter to said pawl, whose own reciprocating movement effects the shift.

8. The combination of radially slotted reels having opposed ratchet wheels, a ribbon extending between said reels, anchors for the ribbon ends slidable in the radial slots of the reels, a reversible reciprocating pawl for alternately engaging said ratchets, and a reciprocating pawl shifter operated by said anchors to present said shifter to said pawl, whose own reciprocating movement effects the shift.

9. The combination of radially slotted and hub-recessed reels having opposed ratchet wheels, a ribbon extending between the reels, anchors for the ribbon ends adapted to engage the hub-recesses of the reels and slidable in the radial slots thereof, a reversible reciprocating pawl for alternately engaging said ratchets, and a reciprocating pawl shifter operated by said anchors to present said shifter to said pawl, whose own reciprocating movement effects the shift.

10. The combination of reels having opposed ratchets, rods carried by said reels and radially movable with reference thereto, a ribbon secured at its ends to said rods, a reversible reciprocating pawl for alternately engaging said ratchet wheels, and a reciprocating shifter operated by the rods to present said shifter to said pawl, whose own reciprocating movement effects the shift.

11. The combination of reels having opposed ratchet wheels, a ribbon extending between said reels, anchors for the ends of said ribbon radially movable in the reels, a reversible reciprocating pawl for alternately engaging said ratchets, and a reciprocating

pawl shifter operated by said anchors, the same comprising a bar mounted on radius links.

12. The combination of radially slotted reels having opposed ratchet wheels, a ribbon extending between said reels, anchors for the ribbon ends slidable in the radial slots of the reels, a reversible reciprocating pawl for alternately engaging said ratchets, and a reciprocating pawl shifter operated by said anchors, the same comprising a bar mounted on radius links.

13. The combination of radially slotted and hub-recessed reels having opposed ratchet wheels, a ribbon extending between the reels, anchors for the ribbon ends adapted to engage the hub-recesses of the reels and slidable in the radial slots thereof, a reversible reciprocating pawl for alternately engaging said ratchets, and a reciprocating pawl shifter operated by said anchors, the same comprising a bar mounted on radius links.

14. The combination of reels having opposed ratchets, rods carried by said reels and radially movable with reference thereto, a ribbon secured at its ends to said rods, a reversible reciprocating pawl for alternately engaging said ratchet wheels, and a reciprocating shifter operated by the rods, the same comprising a bar mounted on radius links.

15. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a reversible pawl thereon adapted to alternately engage said ratchet wheels, a shifting tappet-piece, a ribbon extending between the reels, and means controlled by said ribbon for moving the tappet-piece into and out of the path of the pawl the reciprocation of the pawl carrier directly effecting the shift of the pawl from one ratchet wheel to the other.

16. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a reversible pawl pivoted thereon adapted to alternately engage said ratchet wheels, a shifting tappet-piece, a ribbon extending between the reels, and means controlled by said ribbon for moving the tappet-piece into and out of the path of the pawl on opposite sides of the pivot thereof.

17. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a double acting pawl pivoted on said carrier and having abutments on opposite sides of its pivot, a shifting tappet-piece, a ribbon extending between the reels and means controlled by said ribbon for moving the tappet-piece into and out of the path of the abutments of the pawl.

18. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a reversible pawl thereon adapted to alternately engage said ratchet wheels, a shifting tappet-piece, a ribbon extending between the reels, and means controlled by said ribbon for moving the tappet-piece into and out of the path of the pawl, said means comprising provisions for automatically varying the points of attachment of the ribbon to the reels radially thereof.

19. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a reversible pawl pivoted thereon adapted to alternately engage said ratchet wheels, a shifting tappet-piece, a ribbon extending between the reels, and means controlled by said ribbon for moving the tappet-piece into and out of the path of the pawl on opposite sides of the pivot thereof, said means comprising provisions for automatically varying the points of attachment of the ribbon to the reels radially thereof.

20. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a double acting pawl pivoted on said carrier and having abutments on opposite sides of its pivot, a shifting tappet-piece, a ribbon extending between the reels and means controlled by said ribbon for moving the tappet-piece into and out of the path of the abutments of the pawl, said means comprising provisions for automatically varying the points of attachment of the ribbon to the reels radially thereof.

21. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a reversible pawl thereon adapted to alternately engage said ratchet wheels, a shifting tappet-piece, a ribbon extending between the reels, and anchors for the ends of the ribbon radially movable in the reels and adapted to shift the tappet-piece, the reciprocation of the pawl carrier directly effecting the shift of the pawl from one ratchet wheel to the other.

22. The combination of radially slotted reels having opposed ratchet wheels, a reciprocating pawl carrier, a reversible pawl pivoted thereon adapted to alternately engage said ratchet wheels, a shifting tappet-piece, a ribbon extending between the reels, and anchors for the ribbon ends slidable in the radial slots of the reels and adapted to shift the tappet-piece the reciprocation of the pawl carrier directly effecting the shift of the pawl from one ratchet wheel to the other.

23. The combination of radially slotted and hub-recessed reels having opposed ratchet wheels, a reciprocating pawl carrier, a double acting pawl pivoted on said carrier and having abutments on opposite sides of its pivot, a shifting tappet-piece, a ribbon extending between the reels, and anchors for the ribbon ends adapted to engage the hub-recesses of the reels and slidable in the radial slots thereof, said anchors adapted to shift the tappet-piece.

24. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a reversible pawl thereon adapted to alternately engage said ratchet wheels, a shifting tappet-bar mounted on radius links, a ribbon extending between the reels, and means controlled by said ribbon for moving the tappet-bar into and out of the path of the pawl.

25. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a reversible pawl pivoted thereon adapted to alternately engage said ratchet wheels, a shifting tappet-bar mounted on radius links, a ribbon extending between the reels, and means controlled by said ribbon for moving the tappet-bar into and out of the path of the pawl on opposite sides of the pivot thereof.

26. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a double acting pawl pivoted on said carrier and having abutments on opposite sides of its pivot, a shifting tappet-bar mounted on radius links, a ribbon extending between the reels, and means controlled by said ribbon for moving the tappet-bar into and out of the path of the abutments of the pawl.

27. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a reversible pawl thereon adapted to alternately engage said ratchet wheels, a shifting tappet-bar mounted on radius links, a ribbon extending between the reels, and means controlled by said ribbon for moving the tappet-bar into and out of the path of the pawl, said means comprising provisions for automatically varying the points of attachment of the ribbon to the reels radially thereof.

28. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a reversible pawl pivoted thereon adapted to alternately engage said ratchet wheels, a shifting tappet-bar mounted on radius links, a ribbon extending between the reels, and means controlled by said ribbon for moving the tappet-bar into and out of the path of the pawl on opposite sides of the pivot thereof, said means comprising provisions for automatically varying the points of attachment of the ribbon to the reels radially thereof.

29. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a double acting pawl pivoted on said carrier and having abutments on opposite sides of its pivot, a shifting tappet-bar mounted on radius links, a ribbon extending between the reels, and means controlled by said ribbon for moving the tappet-bar into and out of the path of the abutments of the pawl, said means comprising provisions for automatically varying the points of attachment of the ribbon to the reels radially thereof.

30. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a reversible pawl thereon adapted to alternately engage said ratchet wheels, a shifting tappet-bar mounted on radius links, a ribbon extending between the reels, and anchors for the ends of the ribbon radially movable in the reels and adapted to shift the tappet-bar.

31. The combination of radially slotted reels having opposed ratchet wheels, a reciprocating pawl carrier, a reversible pawl pivoted thereon adapted to alternately engage said ratchet wheels, a shifting tappet-bar mounted on radius links, a ribbon extending between the reels, and anchors for the ribbon ends slidable in the radial slots of the reels and adapted to shift the tappet-bar.

32. The combination of radially slotted and hub-recessed reels having opposed ratchet wheels, a reciprocating pawl carrier, a double acting pawl pivoted on said carrier and having abutments on opposite sides of its pivot, a shifting tappet-bar mounted on radius links, a ribbon extending between the reels, and anchors for the ribbon ends adapted to engage the hub-recesses of the reels and slidable in the radial slots thereof, said anchors adapted to shift the tappet-bar.

33. The combination of reels having opposed ratchet wheels, a reciprocating pawl carrier, a double acting pawl pivoted on said carrier and having abutments on opposite sides of its pivot, a shifting tappet-bar, having confronting projections to alternately enter the paths of the pawl abutments, a ribbon extending between the reels, and means controlled by said ribbon for shifting the tappet-bar.

34. The combination of reels having opposed ratchets, rods carried by said reels and radially movable with reference thereto, a ribbon secured at its ends to said rods, a reciprocating pawl carrier, a reversible pawl mounted thereon and adapted to engage one or the other of the ratchet wheels, and a tappet-bar for said pawl adapted to be shifted by the said ribbon rods the reciprocation of the pawl carrier directly effecting the shift of the pawl from one ratchet wheel to the other.

35. The combination of reels having opposed ratchets, rods carried by said reels, and radially movable with reference thereto, a ribbon secured at its ends to said rods, a reciprocating pawl carrier, a reversible pawl pivotally mounted thereon and adapted to engage one or the other of the ratchet wheels, said pawl having abutments on opposite sides of its pivot, and a tappet bar shiftable by the ribbon rods and having projections to enter the paths of the pawl abutments.

36. The combination of reels having opposed ratchets, rods carried by said reels and radially movable with reference thereto, a ribbon secured at its ends to said rods, a reciprocating pawl carrier, a reversible pawl pivotally mounted thereon and adapted to engage one or the other of the ratchet wheels, said pawl having abutments on opposite sides of its pivot, and a tappet-bar mounted on radius links and shiftable by the ribbon rods and having projections to enter the paths of the pawl abutments.

37. The combination of ribbon-carrying reels having opposed ratchet wheels, a reciprocating actuating pawl pivotally mounted and movable into engagement with either of said wheels, a pivotally mounted restraining pawl movable into engagement with either of said wheels, and connections between said pawls causing the shifting of one to shift the other.

38. The combination of ribbon-carrying reels having opposed ratchet wheels, a reciprocating actuating pawl pivotally mounted and movable into engagement with either of said wheels, a pivotally mounted restraining pawl movable into engagement with either of said wheels, and a spring connecting said pawls to produce simultaneous shifting thereof.

39. The combination of ribbon-carrying reels having opposed ratchet wheels, a reciprocatory actuating pawl pivotally mounted and movable into engagement with either of said wheels, a pivotally mounted restraining pawl movable into engagement with either of said wheels, and a spring connecting said pawls outwardly beyond their pivots to produce simultaneous shifting; substantially as described.

40. The combination of ribbon-carrying reels having opposed ratchet wheels, a reciprocatory actuating pawl pivotally mounted and movable into engagement with either of said wheels, a pivotally mounted restraining pawl movable into engagement with either of said wheels, connections between said pawls causing the shifting of one to shift the other, and means for automatically reversing the pawls by the running out of the ribbon.

41. The combination of ribbon-carrying reels having opposed ratchet wheels, a reciprocating actuating pawl pivotally mounted and movable into engagement with either of said wheels, a pivotally mounted restraining pawl movable into engagement with either of said wheels, a spring connecting said pawls to produce simultaneous shifting thereof, and means for automatically reversing the pawls by the running out of the ribbon.

42. The combination of ribbon-carrying reels having opposed ratchet wheels, a reciprocatory actuating pawl pivotally mounted and movable into engagement with either of said wheels, a pivotally mounted restraining pawl movable into engagement with either of said wheels, a spring connecting said pawls outwardly beyond their pivots to produce simultaneous shifting, and means for automatically reversing the pawls by the running out of the ribbon.

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