

Dec. 21, 1954

B. F. MADSEN
RIBBON REVERSE MECHANISM

2,697,505

Filed Dec. 11, 1951

2 Sheets-Sheet 1

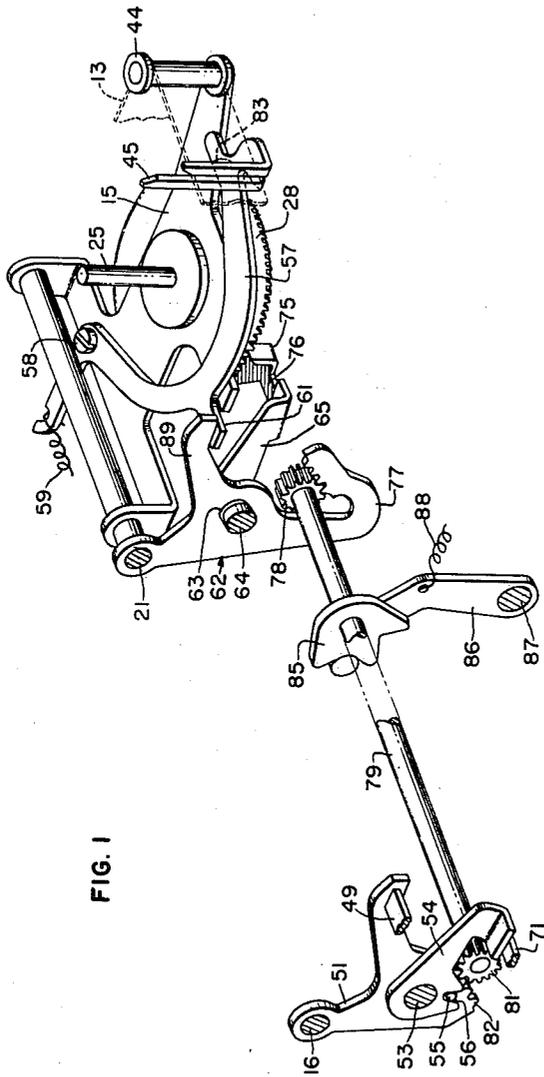


FIG. 1

FIG. 2

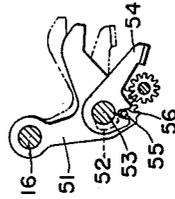
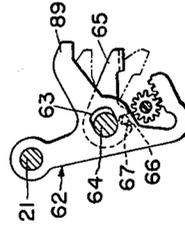


FIG. 3



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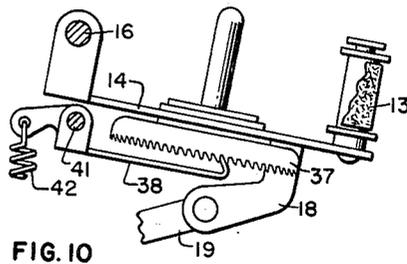
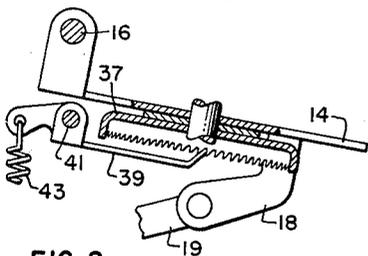
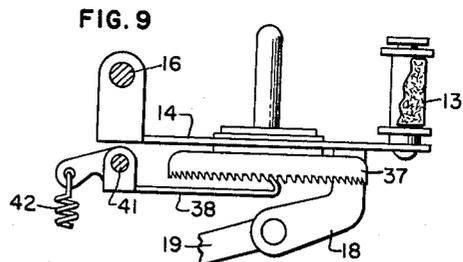
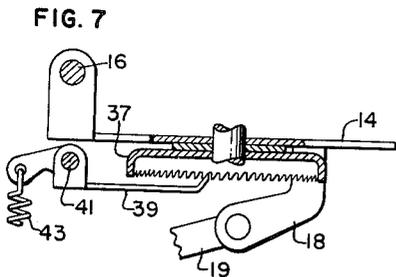
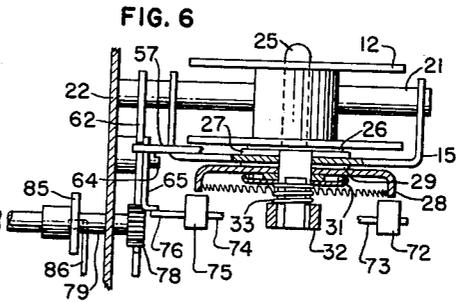
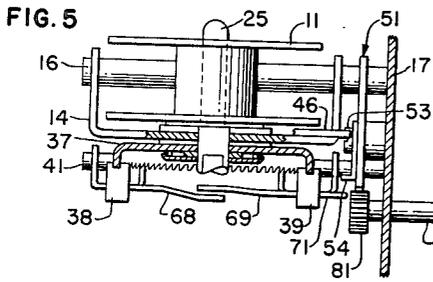
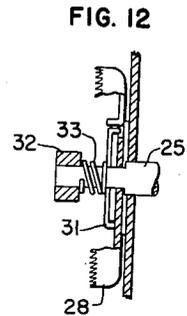
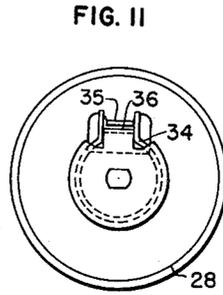
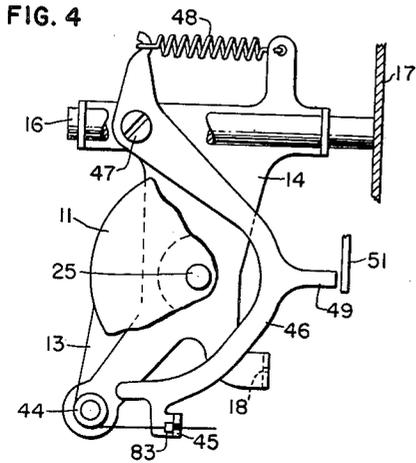


FIG. 8

FIG. 10

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RIBBON REVERSE MECHANISM

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Application December 11, 1951, Serial No. 261,042

7 Claims. (Cl. 197-165)

This invention relates to printing telegraph apparatus and more particularly to ribbon controlling mechanism therefor.

The primary object of the invention is to provide ribbon feed and automatic ribbon reversing mechanisms for printing telegraph apparatus.

Another object of the invention is to provide in a ribbon feed mechanism wherein the ribbon spools are mounted on platforms which are oscillated vertically to effect ribbon feed, an automatic ribbon reversing mechanism comprising a ribbon reverse lever which cooperates jointly with a rivet provided near each end of the ribbon and a rack and pinion ribbon reverse device which functions automatically to disable the ratchet pawls alternately from their respective ratchets.

A better understanding of the invention may be had from the following description, taken in conjunction with the accompanying drawings, wherein,

Fig. 1 is a perspective representation of the ribbon feed and automatic ribbon reversing mechanism according to the present invention;

Figs. 2 and 3 are elevational views showing the relation of the reversing levers to the reversing shaft;

Fig. 4 is a plan view of the ribbon control mechanism;

Figs. 5 and 6 are front elevational views of the ribbon control mechanism, and

Figs. 7 to 12, inclusive, are detail views of the ribbon feed mechanism.

The ribbon feed mechanism according to the present invention comprises a pair of ribbon spool means 11 and 12 for winding the inking ribbon 13 from one spool to the other in the manner shown and described in U. S. Patent No. 2,505,729 granted April 25, 1950, to W. J. Zenner. In the embodiment illustrated herein an improved means is provided for reversing the direction of movement of the inking ribbon. As indicated in Figs. 4 to 10, the ribbon mechanism embodies a pair of ribbon spool platforms 14 and 15 (comparable to platforms 192 and 219 shown in Figs. 13 and 18 of said Patent No. 2,505,729) for supporting the ribbon spools 11 and 12. The platform 14 is supported pivotally on the stud shaft 16 secured to the side plate 17 and is provided with a depending projection 18 which is pivotally connected to a link 19. The platform 15 is similarly supported pivotally on a stud shaft 21 (Fig. 6) secured to the side plate 22 and is similarly provided with a depending portion which is pivotally connected to a link (not shown) similar to link 19. Oscillation of platforms 14 and 15 is effected through their respective links in the manner shown and described in said Patent No. 2,505,729.

As illustrated in Fig. 6, the ribbon spool 12 is mounted on a spindle 25 having an integral flange 26. Disposed between flange 26 and the platform 15 is a felt or leather washer 27 (or of like material). Between the bottom surface of platform 15 and a feed ratchet wheel 28 is a washer 29 of leather, felt or like material. On the lower side of ratchet 28 is placed a dished portion 31. Pinned to the lower end of the spindle shaft is a collar 32, and a compression spring 33 is provided between the flange 26 and the collar 32 to clamp together all of the aforesaid interposed members. Housed within the dished member 31 is a circular spring element 34 (Fig. 11) the ends of which are adapted to cooperate with laterally disposed projections 35 and 36 on the ratchet 28 and dished member 31, respectively. The member 31 is provided with an oblong hole adapted to fit the flattened portion of the spindle 25.

The reel or spool 11 is operably related to the platform 14 (Fig. 5) in a manner identical with the way the reel 12 is related to the platform 15 (Fig. 6). The ratchets 28 and 37 are in the form of inverted cups having serrated edges. Co-operating with the toothed edge of ratchet 37 is a pair of pawl members 38 and 39 which are supported pivotally upon a stud shaft 41 secured to the side frame 17 below the pivot shaft 16. The pawls for ratchet 28 are similarly pivoted on a stud shaft (not shown). The pawls 38 and 39 are normally biased into cooperative engagement with the ratchets by means of springs 42 and 43, respectively.

Having reference to Figs. 7 and 8, the relative position of the pivot shafts 16 and 41 is such that when the platform 14 is rocked by the link 19, clockwise rotation is imparted to the ratchet 37 upon the downward stroke of the platform 14, as exemplified by the relative position of the free end of the pawl 39 with respect to the ratchet 37 in Figs. 7 and 8. Upon the upward stroke of the platform 14 further clockwise motion is imparted to the ratchet 37. To accomplish this result the end of the pawl 38 is reverted so that upon the downward stroke of the platform 14 (and hence ratchet 37) the pawl 38 will pick up a tooth and upon the upward stroke the pawl 38 will act to impart clockwise rotation to the ratchet 37. With this arrangement utilizing a pair of pawls, rotation of the ratchet will ensue.

In accordance with the present invention, mechanism is also provided for automatically reversing the direction of the ribbon being fed from one spool to the other. Having reference to Fig. 4, the inking ribbon 13 extends from the spool 11 around a guide roller 44 mounted on the platform 14. Ribbon 13 is then threaded through the bifurcated extremity 45 of a ribbon lever 46, mounted pivotally at 47 on the platform 14. Lever 46 is normally biased clockwise (as viewed in Fig. 4) by a spring 48. Further, lever 46 is provided with a projection 49 which cooperates with a ribbon reverse lever 51 (Figs. 1, 2, 4 and 5) mounted pivotally on the pivot shaft 16.

As viewed in Fig. 2, the lever 51 is provided with a slotted hole 52 through which extends a pivot stud 53 also secured to the side frame 17 and on which is pivotally supported a ribbon feed reverse lever 54. Lever 51 is also provided with a stud pin 55 adapted to fit in a notch 56 in the lever 54 whereby rotation of lever 54 about pivot 53 is derived from lever 51 through pin 55. The purpose of this arrangement is to permit greater angular movement of lever 54 per unit of angular movement of lever 51, than if levers 51 and 54 were an integral structure; that is, fashioned from a single piece of metal. The utility of this construction will appear presently.

Similarly associated with the platform 15 (as viewed in Fig. 1) is a ribbon lever 57, comparable to lever 46, mounted pivotally at 58 on said platform. Lever 46 is normally biased counterclockwise by a spring 59, and is provided with a projection 61 which cooperates during the ribbon reversing operation with a ribbon reverse lever 62 pivotally mounted on the pivot shaft 21.

Having reference to Fig. 3, the lever 62, like lever 51, is provided with a slotted hole 63 through which extends a pivot stud 64 secured to side frame 22 and on which is pivotally supported a ribbon feed reverse lever 65. Lever 62 is also provided with a stud pin 66 adapted to fit in a notch 67 in the lever 65 through which rotation is imparted to lever 65 by lever 62. With this arrangement, greater angular movement of lever 65 per unit of angular movement of lever 62 is obtained.

Pawl 38 (Fig. 5) is provided with a sidewardly directed arm 68 the extremity of which is disposed below the extremity of an arm 69 integral with pawl 39. Pawl 39 is also provided with an arm 71 oppositely disposed to arm 69 which cooperates with the laterally directed extremity of lever 54 (Figs. 1 and 5). Similarly, pawl 72 (Fig. 6), comparable to pawl 38, is provided with an arm 73 the extremity of which (not shown) is disposed below the extremity of an arm 74 integral with a pawl 75 (comparable with pawl 39). Pawl 75 is also provided with an arm 76 oppositely disposed to arm 74 which cooperates with the laterally directed extremity of lever 65.

Lever 62 is provided with an arm 77 (Fig. 1) terminating in a rack portion adapted to cooperate with a pinion

78 secured to a ribbon reversing shaft 79 suitably journaled in the printer. Fixed to the opposite end of shaft 79 is a pinion 81 adapted to cooperate with a rack portion 82 on the lever 51. A rivet 83 is provided near each end of the ribbon 13 so that when the supply of ribbon is nearly exhausted from reel or spool 12 (or spool 11), the rivet 83 near the end of the ribbon from the exhausted reel 12 will fail to pass through the slit in the bifurcated end 45 of the ribbon lever 57 thus causing, during the ensuing operation, the projection 61 to be presented below the arm 89 of the ribbon reversing lever 62 so that, upon the next oscillation of the platform 15 the lever 62 will be rotated counterclockwise to cause, through rack arm 77 and pinion 78, the ribbon reversing shaft 79 to be likewise rotated counterclockwise. Fixed to shaft 79 is a detent cam 85 which cooperates with a detent lever 86 mounted pivotally on pivot 87 and spring biased in a clockwise direction by a spring 88.

The ribbon reverse mechanism according to the present invention operates as follows: Assuming that the pawls 38 and 39 are in engagement with the ratchet wheel 37 (Fig. 5) and the pawls 72 and 75 are out of engagement with the ratchet wheel 28, the movement of the ribbon 13 (upon oscillation of the platform 14) is such that it will be pulled from reel 12 and wound around reel 11. When the supply of ribbon from reel 12 is nearly exhausted the rivet 83 near the end of the ribbon thereat will advance toward the slit in the bifurcated end of the ribbon lever 57. Upon further rotation of reel 12 the rivet 83 will compel rotation of the ribbon lever 57 in a clockwise direction (Fig. 1). Thus, during the downward stroke of platform 15 the projection 61 of ribbon lever 57 will slide along the right side of arm 89 of ribbon reverse lever 62 until it subsequently slides under said arm 89, whereafter, upon the upward stroke of the platform 15 the ribbon reverse lever 62 will be rotated counterclockwise about its pivot 21 (Fig. 1). Substantially simultaneously therewith, the lever arm 65 by reason of its pin and notch interconnection 66-67 with lever 62 will be rotated counterclockwise about its pivot 64 to permit the re-engagement of pawls 72 and 75 with the ratchet 28. In the accomplishment of their respective functions, the arms 89 and 65 move different angular amounts. Therefore, to compensate for this difference in angular movement with but a predetermined degree of movement of platform 15, the levers 62 and 65 are supported on independent pivots 21 and 64, respectively, and are operably interconnected by the pin and notch means 66-67. By varying the distance between the centers of pivot 64 and pin 66, the angular movement of arm 65 with respect to the angular movement of arm 89 can be varied to suit predetermined operating conditions. A similar relationship appertains between ribbon reverse lever 51 and ribbon feed reverse lever 54 shown in Fig. 2.

The lever 62 in thus rotating counterclockwise about its pivot 21 will, through its rack arm 77, cause ribbon reverse shaft 79 to rotate counterclockwise, as previously mentioned. Pinion 81 on shaft 79 will, through rack portion 82, cause the ribbon reverse lever 51 to rotate clockwise about its pivot 16. This movement of lever 51 will cause, through the pin and notch interconnection 55-56, the lever 54 to rotate in the same direction, thereby causing pawls 38 and 39 to be withdrawn from the ratchet 37 through the instrumentality of arms 71, 69 and 68, which condition of operation will be maintained by the detent cam 85 and lever 86, until a reversal of direction of movement of the ribbon 13 is established.

It is to be understood that the above-described arrangement is merely illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. In a telegraph device, a pair of ribbon carriers, a pair of oscillatable platforms for mounting said carriers in the same horizontal plane, ribbon advancing means comprising stationarily pivoted pawl elements cooperable with said ribbon carriers to effect rotation of said ribbon carriers upon oscillation of said platforms, a ribbon actuated means carried on each platform, ribbon reversing means including a first element cooperable with said ribbon actuated means and a second element cooperable with said pawl elements, and means interconnecting said first and second elements for differential movement to

impart different predetermined increments of movement simultaneously to said pawl elements and said ribbon reversing means, whereby a difference in the movements of said platforms and said pawl elements is compensated for.

2. In a telegraph device, a pair of ribbon carriers, a pair of spaced oscillatable platforms for mounting said carriers in the same horizontal plane, means for oscillating said platforms, ribbon advancing means comprising stationarily pivoted pawls cooperable with said ribbon carriers to effect rotation of said ribbon carriers upon oscillation of said platforms, a ribbon actuated means carried on each platform, ribbon reversing means including a first element cooperable with said ribbon actuated means and a second element cooperable with said pawls, and means interconnecting said first and second elements for differential movement to impart different predetermined increments of movement simultaneously to said pawls and said ribbon reversing means, whereby a difference in the movements of said platforms and said pawls is compensated for.

3. In a telegraph device, an inking ribbon, a pair of ribbon carriers, a ratchet operably associated with each carrier, a pair of spaced platforms for mounting said carriers and ratchets, means for oscillating said platforms, ribbon advancing mechanism comprising stationarily pivoted pawls cooperable with said ratchets to effect rotation of said ribbon carriers upon oscillation of said platforms, a ribbon actuated means carried on each platform, means on said ribbon adapted under certain predetermined conditions of operation to actuate said ribbon actuated means, ribbon reversing means comprising a first element cooperable with said ribbon actuated means and a second element cooperable with said pawls, and means interconnecting said first and second elements for differential movement to impart different predetermined increments of movement simultaneously to said pawls and said ribbon reversing means, whereby a difference in the movements of said platforms and said pawls is compensated for.

4. In a telegraph device, a ribbon to be advanced in said device, a pair of ribbon carriers, a ratchet operably associated with each carrier, a pair of spaced platforms for mounting said carriers and ratchets, means for oscillating said platforms, ribbon advancing means comprising stationarily pivoted pawls cooperable with said ratchets to effect rotation of said ribbon carriers upon oscillation of said platforms, a ribbon actuated means carried on each platform, means on the ribbon adapted upon the exhaustion of the ribbon from either carrier to actuate said ribbon actuated means, ribbon reversing means including a first element cooperable with said ribbon actuated means and a second element cooperable with said pawls, and means articulating said first and second elements for differential movement to impart different incremental movements simultaneously to said pawls and said ribbon reversing means, whereby a difference in the movements of said platforms and said pawls is compensated for.

5. In a telegraph device, a ribbon to be advanced in said device, a pair of ribbon carriers, a ratchet operably associated with each carrier, a pair of spaced platforms for mounting said carriers and ratchets, means for oscillating said platforms, ribbon advancing means comprising stationarily pivoted pawls cooperable with said ratchets to effect rotation of said ribbon carriers upon each oscillation of said platforms, a ribbon actuated means carried on each platform, means on the ribbon adapted upon the exhaustion of the ribbon from either carrier to actuate said ribbon actuated means, a ribbon reversing shaft having a pinion secured to each end, ribbon reversing means comprising a first pivoted element having an arm cooperable with said ribbon actuated means and a rack means cooperable with one of said pinions, and a second independently pivoted element operably articulated to said first pivoted element, said second pivoted element cooperable with said pawls, whereby different angular movements of said platform and said pawls are facilitated.

6. In a telegraph device, a ribbon to be advanced in said device, a pair of ribbon carriers, a ratchet operably associated with each carrier, a pair of spaced platforms for mounting said carriers and ratchets, means for oscillating said platforms, ribbon advancing means comprising stationarily pivoted pawls cooperable with said ratchets

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to effect rotation of said ribbon carriers upon each oscillation of said platforms, a ribbon actuated means operably associated with each platform, a ribbon reversing shaft having a pinion secured to each end, ribbon reversing means comprising a first pivoted element having an arm portion and a rack portion, said rack portion cooperable with one of said pinions, a second independently pivoted element operably articulated to said first pivoted element, said second pivoted element cooperable with said pawls, whereby upon oscillation of said platforms different angular movements of said first pivoted element and said second pivoted element are effected to correspondingly control said ribbon reversing shaft and said pawls, and means on the ribbon adapted upon the exhaustion of the ribbon from either carrier to interpose said ribbon actuated means between said arm portion and said platform.

7. In a telegraph device, a pair of ribbon carriers, a pair of oscillatable platforms for mounting said carriers,

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ribbon advancing means comprising stationarily pivoted pawl elements cooperable with said ribbon carriers to effect rotation of said ribbon carriers upon oscillation of said platforms, a ribbon actuated means carried on each platform, a ribbon reversing shaft having a pinion secured to each end, ribbon reversing means including a first element having an arm cooperable with said ribbon actuated means and a rack cooperable with one of said pinions, and a second element operably articulated to said first element, said second element cooperable with said pawl elements, whereby different angular movements of said platform and said pawl elements are facilitated.

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