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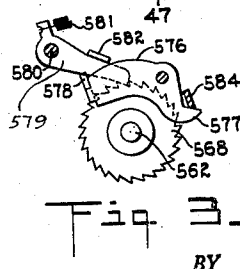
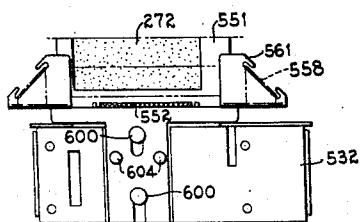
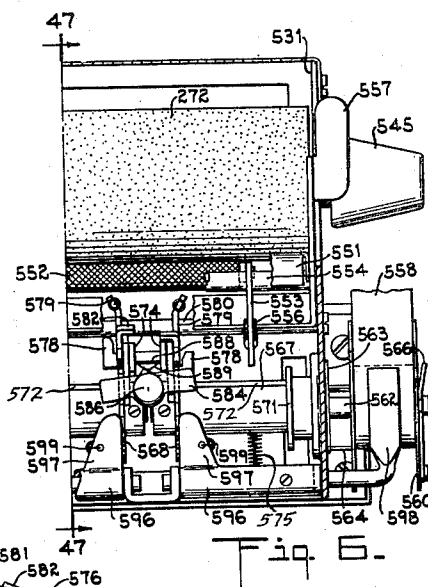
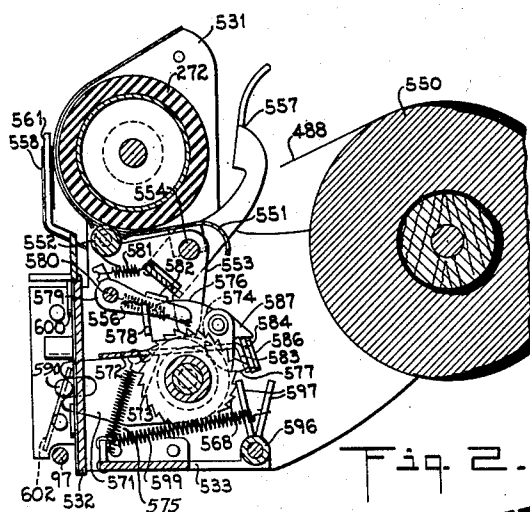
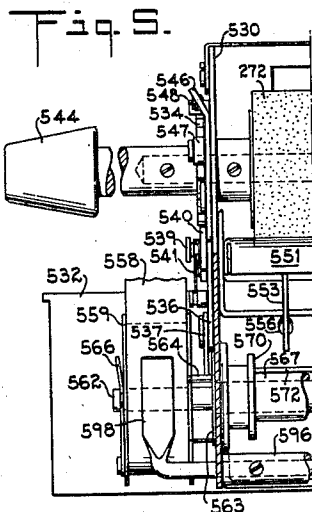
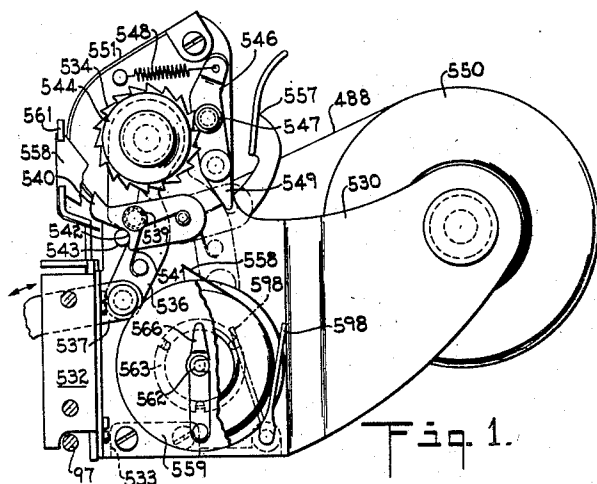
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RIBBON FEED MECHANISM IN SELECTIVE PRINTING MACHINES

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2 Sheets-Sheet 1



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RIBBON FEED MECHANISM IN SELECTIVE PRINTING MACHINES

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Divided and this application November 30, 1953, Serial No. 395,051

11 Claims. (Cl. 101—336)

This invention relates to ribbon feed mechanism for printing apparatus, such as in calculating and similar machines.

This application is a division of my application Ser. No. 176,741 filed July 29, 1950 for "Calculating Machine."

An object of the present invention is to provide a novel constructed printing platen assembly with a traveling ribbon and novel reversing means for the latter, said assembly being adapted for operative connection to a calculating machine or the like for operation thereby.

The above and further objects and novel features of the present invention will more fully appear from the following detail description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only and are not intended as a definition of the limits of the invention.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 is a side elevational view of a paper and ribbon feed unit or printing platen assembly embodying one form of the invention;

Fig. 2 is a vertical side sectional view of the unit shown in Fig. 1, the section being taken substantially on line 47—47 of Fig. 6;

Fig. 3 is a detail side elevational view, partly in section, of a portion of the ribbon feed mechanism;

Fig. 4 is a fragmentary front elevational view of said unit, on a reduced scale, as viewed from the left in Figs. 1 and 2; and

Figs. 5 and 6 are complementary rear elevational views, partly in section and with the paper supply roll removed, Fig. 5 showing elements illustrated in Fig. 1 and Fig. 6 showing elements illustrated in Fig. 2; and

Fig. 7 is a detail isometric view of the ribbon feed and reversing mechanism on an enlarged scale, with parts broken away and with the right and left hand portions broken apart near a central vertical plane and separated in the interest of clarity.

The single embodiment of the inventions illustrated in the accompanying drawings, by way of example, is in the form of a platen assembly embodying novel means for feeding an inked ribbon and for locking the platen against movement during the printing operation. In the illustrated embodiment, said assembly comprises a frame consisting primarily of side plates 530 and 531, a front end plate 532 and a bottom plate 533, all suitably rigidly secured together by screws or the like. The shaft of a platen 272 having a rubber or other suitable surface is journaled in side plates 530, 531 and has a ratchet wheel 534 mounted thereon for rotation therewith.

Pivotaly mounted on the hub of ratchet wheel 534 is a pawl carrier 536 that extends downwardly and pivotally connects with a link 537, the forward end of which extends through plate 532 and is pivotally connected to suitable known means for imparting limited reciprocating movement thereto. Pivoted on a stud 539 on lever 536

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is a ratchet pawl 540 that is biased by a spring 541 toward operative engagement with ratchet wheel 534. The lower edge of pawl 540 has a shoulder 542 adapted to engage a pin or stud 543 on frame plate 530 to effect counter-clockwise movement of the pawl and, hence, disengagement thereof from wheel 534 at the end of the forward movement of the pawl. The platen 272 is thus freed for rotary movement in either direction by handles 544, 545 on the ends of the platen shaft, but such movement is yieldably resisted by an indexing arm assembly comprising a pivoted arm 546 and a roller 547 mounted thereon and held in engagement with ratchet wheel 534 by a spring 548. The lower end 549 of arm 546 extends into the path of lever 536 for engagement thereby at the very end of the rearward stroke of said lever. A counter-clockwise force or torque is thus applied to arm 546 by lever 536 to firmly press roller 547 into engagement with ratchet wheel 534 and hold platen 272 firmly against movement when the type quadrants 218, 250 strike the same.

Thus, on each operating stroke of link 537, the lower end of arm 536 and pawl 540 are moved to the right or toward the rear. Pawl 540, as it moves away from pin 543, is pivoted by spring 541 into engagement with ratchet wheel 534 and lever 536 presses against the lower end 549 of arm 546 to urge roller 547 into firm engagement with said wheel. On the return stroke, pawl 540 is effective to index the platen one tooth of the ratchet and thereafter shoulder 542 thereon engages stud 543 to effect disengagement of the pawl from the ratchet wheel. This is repeated during each cycle of operation of the machine.

An inked ribbon 558 is indexed or fed from one spool 559 to another spool 560, the same being guided and supported to extend across the front face of platen 272 by a vertically movable ribbon guide plate 561. Each spool 559, 560 is removably mounted on the outer end of one of two coaxial shafts 562, 562 for rotation therewith, the driving connections shown comprising radially slotted washers 563 staked on the shafts for cooperation with lugs 564 on the spools. A spring hook 566 on the spool coacts with a groove in the shaft to hold the spool against axial removal. Spool shafts 562 are journaled in coaxial bearings 567 supported by side plates 530 and 531 and have ratchet wheels 568, 568 mounted on the adjacent end portions thereof for rotation therewith.

Novel means are provided for controlling and actuating ratchet wheels 568 alternately to feed ribbon 558 back and forth between the right and left hand spools 559, 560. In the specific form herein shown, said means comprises a bail, the end arms 570, 571 of which are pivoted on bearings 567. Extending rearwardly from the center of the cross-bar 572 of said bail and between ratchet wheels 568, 568 is an arm 573 that terminates in two upturned ears 574, 574. The bail 570—572 is biased in a counter-clockwise direction as viewed in Fig. 2 by suitable resilient means, such as coil spring 575. Upon pivotal movement of bail 570—572 about bearings 567 and hence, about the axis of shafts 562, the arm 573 moves in an arc about said axis. Pivotaly mounted on each ear 574 and adjacent a ratchet wheel 568 is an operating pawl 576 with a rearwardly extending nose 577. A lug 578 on the forward end of each operating pawl 576 extends laterally over the adjacent ratchet wheel 568 and beneath a locking pawl 579 pivoted on a rod 580 and also adapted to operatively engage a ratchet wheel 568. Each pawl 579 is biased clockwise (Fig. 2) and toward a ratchet wheel 568 by a spring 581 connected to the cross-bar of bail 557 and each said pawl has a tab 582 extending laterally from the top edge thereof and over the operating pawl 576 adjacent thereto.

The outer or rear end 583 of the center arm 573 on

bail 572 is bent downwardly and has a transversely-extending double-ended lever 584 pivotally mounted thereon by means of a headed pin 586. Upward movement of the opposed ends of lever or arm 584 is limited by pointed rearward projections or stops 587 of ears 574 and said lever is yieldably held in one or the other of its limiting positions by a leaf spring 588 mounted on arm 573. For this purpose the rear end of the spring 588 has a cone-shaped projection 589 on the lower surface thereof for cooperation with an inverted V-shaped hump on the central upper edge of lever 584, whereby said spring functions as an over-center snap action spring means in conjunction with lever 584. The nose portions 577 of pawls 576 extend into the paths of the ends of said lever 584 so that when an end of the latter is depressed, it will pivot a pawl 576, 577 clockwise to thereby lift the lug 578 on the pawl out of engagement with its associated ratchet wheel and into engagement with a locking pawl 579 to lift the latter away from the ratchet wheel. It will thus be seen that lever 584 is effective to hold either set of pawls 576, 579 in inoperative position while the other set is biased to operative position by a spring 581 and gravity.

Actuation of pawl sets 576, 579 is effected through bail 572, the left hand end arm 571 of which, as viewed from the left in Fig. 2, has a forked extension (Fig. 2) that projects forwardly through frame plate 532 for operative engagement with a pin 590. The latter is vertically actuable by any suitable known means (not shown) to thereby lift pin 590 and pivot bail 572 clockwise.

Clockwise movement of bail 572, 573 is effective to carry operating pawls 576 rearwardly. The pawl 576 which is then in operative position will index the ratchet wheel 568 engaged by lug 578 on the pawl and, hence, index said wheel and the ribbon spool connected therewith in a clockwise direction (Fig. 2). This movement of one spool will pull the ribbon 558 from the other spool. Thus, during successive cycles of operation of the machine, the ribbon is indexed from one spool to the other, the direction depending upon which set of pawls 576, 579 is in operative position. Pawls 579 are operative to prevent reverse or counter-clockwise movement of the ratchet wheels 568.

Means are provided for automatically actuating lever 584 for reversing the direction of travel of the ribbon 558 when most of it has been accumulated on one of the spools therefor. Said means comprises a pivotally mounted U-shaped member 596 having vertically projecting end arms 597 and 598. There is one U-shaped member or rocker 596 at each side of the platen frame (Figs. 5 and 6). Feeler arm 598 is biased by a spring 599 into engagement with the surface of the ribbon in one of the spools 559, 560. Arm 597 is mounted to move into the path of the adjacent end of lever 584 when the ribbon on the spool associated therewith is substantially depleted and said lever is moved forwardly and downwardly by pivotal movement of bail arm 573, 583. Thus, as the ribbon is fed onto one spool by the operation of one set of pawls 576, 579, the upper end of arm 598 therein moves toward the rear and carries its associated arm 597 with it and out of the path of lever 584. When the ribbon on the other spool has been depleted to a predetermined minimum, arm 597 of the rocker 596 associated with said other will have been moved forwardly by spring 599 into the path of lever 584 for engagement by the depressed end of said lever during an indexing stroke, i. e. during downward movement of the lever with arm 573, 583. Such engagement will cause the lever 584 to pivot to its other limiting position under control of spring 588. The parts will thus be rendered operative to pull the ribbon back to the empty spool during successive operating cycles of the machine. When this spool fills up the control lever 584 is again actuated by the other member 597 to again reverse the direction of ribbon feed in the same manner. In the drawings, the

left end of lever 584 (Fig. 6) is in depressed position so that the parts are operative to feed ribbon from the left spool (Fig. 5) to the right spool (Fig. 6). This operation will be reversed when arm 597 of the left rocker 596 (Figs. 5 and 6) moves forwardly and below the depressed end of said lever 584 to cause the latter to flip to its other position as it moves bodily downward with the rear end of bail arm 573 when the latter is actuated by bail 571, 572.

There is thus provided an extremely compact and versatile machine wherein a relative small number of parts have been assembled in novel combinations which function in novel combination with each other. The various elements of the machine are designed and assembled with a view to facilitating assembly as well as inspection and repair of the machine. The parts of the machine may be readily and inexpensively manufactured and assembled by known manufacturing processes.

Although only a single embodiment of the invention has been illustrated and described, it is to be expressly understood that the invention is not limited thereto but that various changes, particularly in the design and arrangement of the parts shown, may be made without departing from the spirit and scope of the invention as it will now be understood by those skilled in the art.

What is claimed is:

1. In apparatus of the class described, a pair of coaxial spools each mounted on one of two rotatable shafts, a ribbon connected to said spools, and means for selectively actuating said shafts and the spools thereon to wind said ribbon onto the actuated spool, said actuating means comprising an arm extending transversely of said shafts in radially spaced relation thereto and pivoted for angular movement about the axis of said shafts, said arm being biased in one direction by resilient means, a ratchet wheel mounted on one of said shafts, a ratchet wheel mounted on the other of said shafts, an operating pawl mounted on said arm and biased toward operative engagement with one of said ratchet wheels and another operating pawl mounted on said arm and biased toward operative engagement with the other of said ratchet wheels, means for selectively holding one or the other of said operating pawls out of engagement with its associated ratchet wheel, and means for successively actuating said pawl carrying arm and said pawls in an arc about the axis of said shafts against the efforts of said resilient means to thereby index the wheel which is then operatively engaged by a said pawl.

2. Apparatus as defined in claim 1 wherein said means for holding one or the other of said operating pawls out of operative engagement with its ratchet wheel comprises a double ended lever mounted on said pawl carrying arm for pivotal movement about an axis extending transversely to the axis of said operating pawls, and wherein said operating pawls have extensions in the paths of the opposite ends of said lever, whereby one of said pawls is held inoperative when the lever is in one position and the other said pawl is held inoperative when the lever is in another position.

3. Apparatus as defined in claim 2 comprising stops on said arm and engageable by opposite ends of said lever for limiting the pivotal movement of said lever in both directions.

4. Apparatus as defined in claim 3 comprising over-center snap-action spring means for yieldably holding said lever in its limiting positions.

5. Apparatus as defined in claim 4 comprising means operable in accordance with the amount of ribbon on said spool for moving said lever from one of its limiting positions to the other for reversing the direction of movement of the ribbon between the spools.

6. Apparatus as defined in claim 1 comprising a spring biased locking pawl associated with each ratchet wheel and movable to inoperative position by the operating pawl associated with the same ratchet wheel when said operating pawl is moved to inoperative position, said locking

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pawls being operative to prevent reverse movement of said ratchet wheels.

7. Apparatus as defined in claim 4 comprising pivoted control means for said lever including a part engageable with the ribbon on a said spool and a part movable into the path of movement of one end of said lever to effect actuation of the latter from one to the other of its limiting positions when the ribbon roll on said spool attains a predetermined diameter.

8. In apparatus of the class described, a frame, a pair of coaxial shafts rotatably mounted in said frame, a spool mounted on each of said shafts for rotation therewith, a ribbon having its ends connected to said spools, and means for selectively actuating said shafts and the spools thereon to wind said ribbon onto the spool which is thus selectively actuated, said actuating means comprising an arm extending transversely of said shaft in radially spaced relation thereto and pivoted for bodily angular movement in an arc having its center at the axis of said shafts, said arm being biased in one direction of movement by resilient means, a ratchet wheel mounted on each of said shafts for rotation therewith, and a pair of operating pawls mounted on said arm, each said pawl being biased toward operative engagement with a said ratchet wheel, means for selectively holding one or the other of said operating pawls out of operative engagement with its ratchet wheel, and means including said resilient means for reciprocating said arm and operating pawls along said arc to thereby index the ratchet wheel which is then operatively engaged by one of said pawls.

9. In apparatus of the class described, a pair of axially spaced spools mounted for rotation about a common axis, a ribbon connected to said spools to be wound back and forth from one to the other and means for selectively actuating said spools to wind said ribbon onto the spool which is so actuated, said actuating means comprising a ratchet wheel connected to each of said spools for rotation therewith, an arm extending transversely of said axis in radially spaced

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relation thereto between said ratchet wheels and being pivotally mounted to move in an arc of a circle containing said axis, said arm being biased in one direction by resilient means, and a pair of operating pawls mounted on said arm, one of said pawls being biased toward operative engagement with one of said ratchet wheels and the other of said pawls being biased toward operative engagement with the other of said ratchet wheels, means for holding one or the other of said operating pawls out of engagement with its ratchet wheel, and means for reciprocating said arm and said pawls in said arc to thereby index the ratchet wheel which is then operatively engaged by one of said pawls.

10. Apparatus as defined in claim 9 comprising control means responsive to the portion of the ribbon wound on one or the other of said spools and operative to effect actuation of said holding means to move one of said operating pawls out of operative engagement with its ratchet wheel and permit movement of the other of said operating pawls into operative engagement with its ratchet wheel for reversing the direction of movement of the ribbon between the spools.

11. Apparatus as defined in claim 9 comprising two coaxial rotatable shafts having said spools secured to the remote end portions thereof and said ratchet wheels secured to the adjacent end portions thereof for rotation therewith.

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