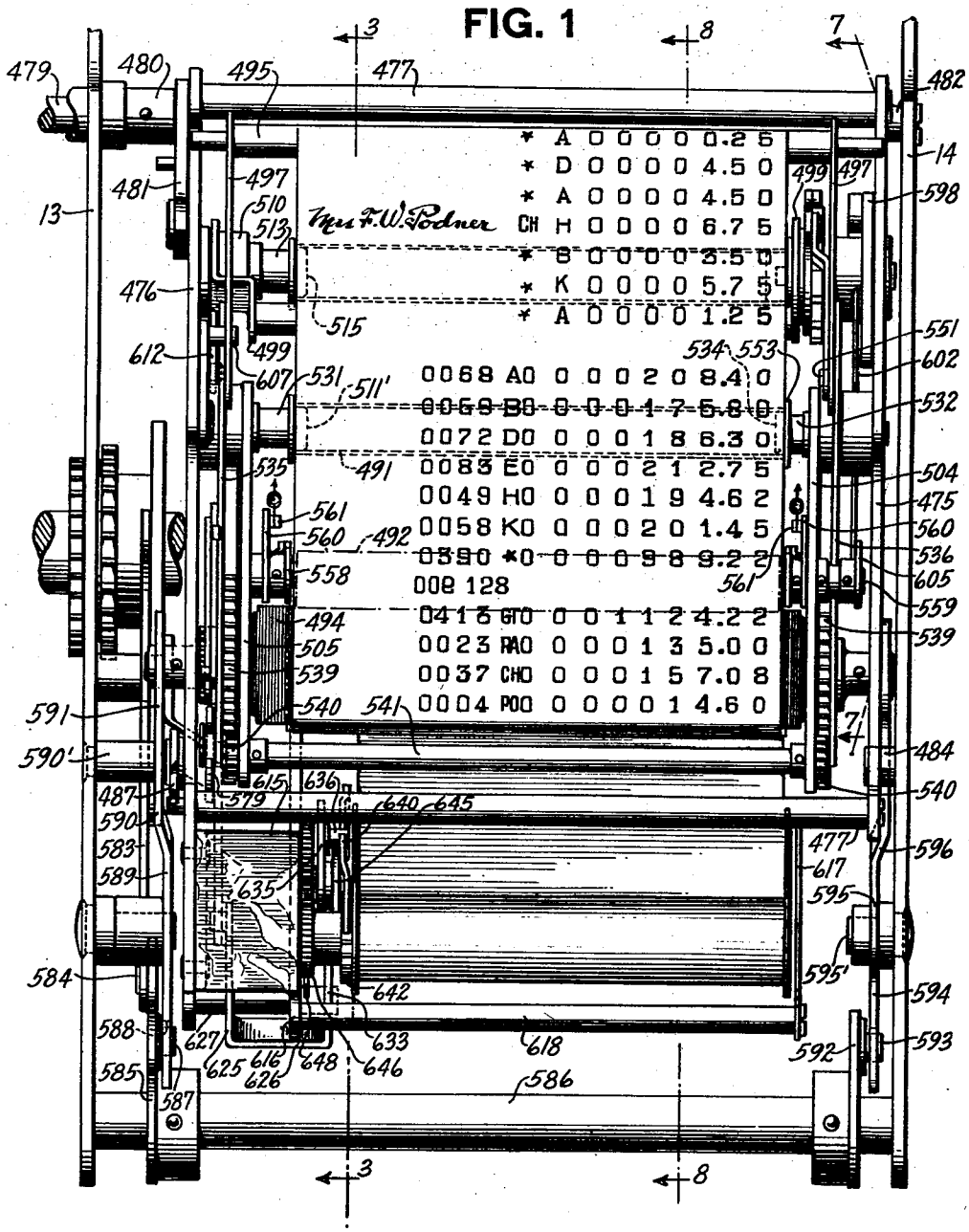
July 30, 1940. C. W. GREEN 2,209,773

CASH REGISTER

Original Filed March 27, 1931 4 Sheets-Sheet 1

FIG. 1



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CASH REGISTER

Original Filed March 27, 1931 4 Sheets-Sheet 2

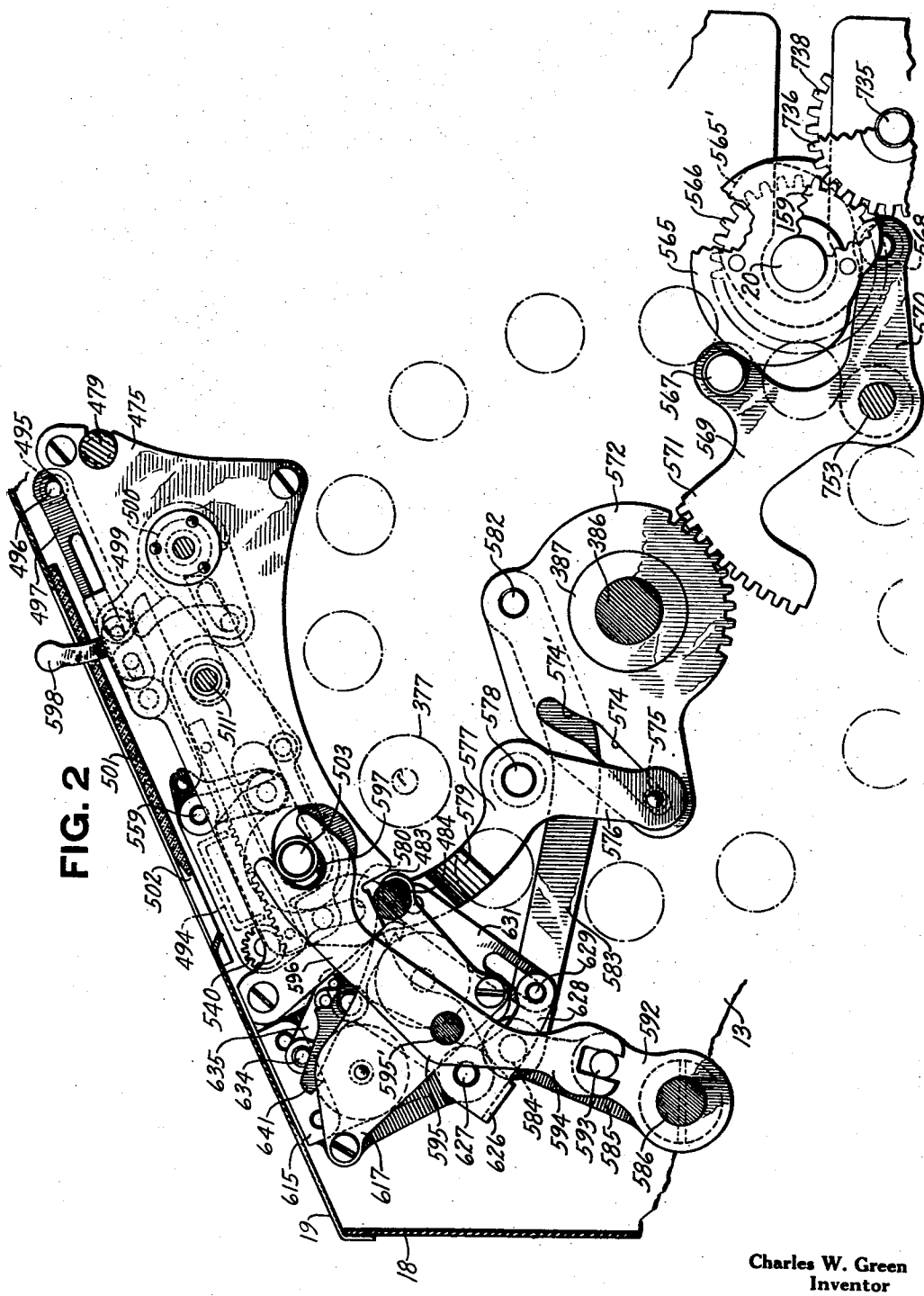


FIG. 2

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FIG. 3

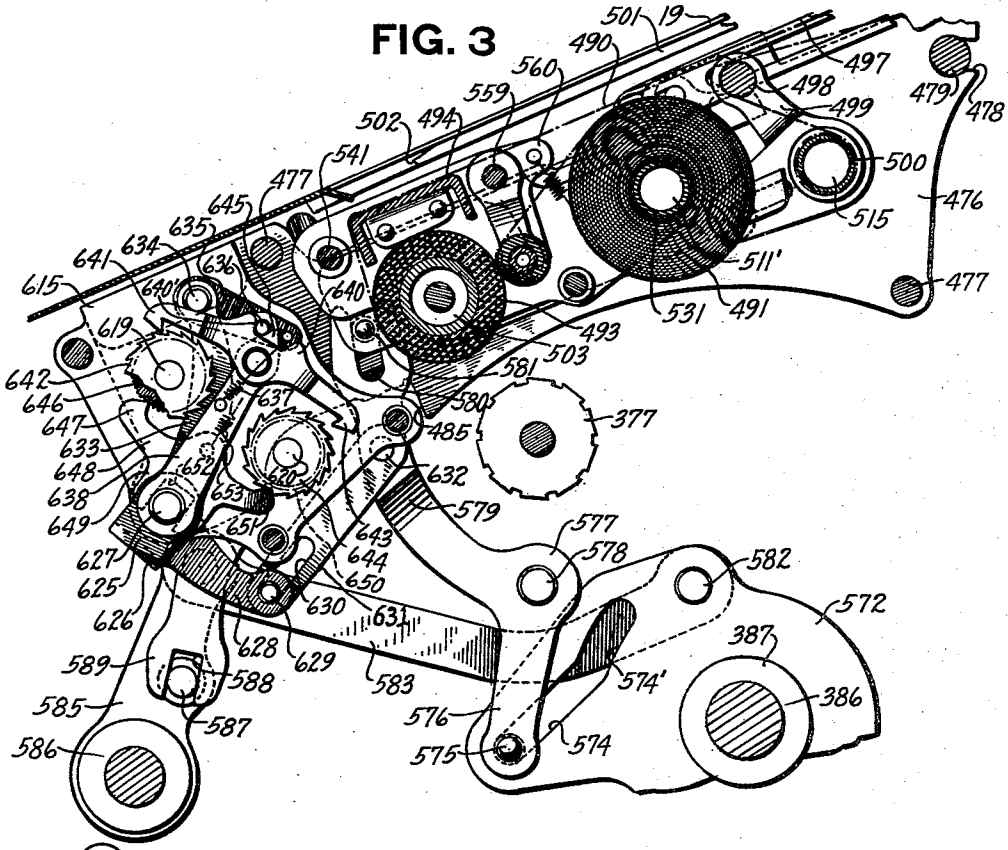
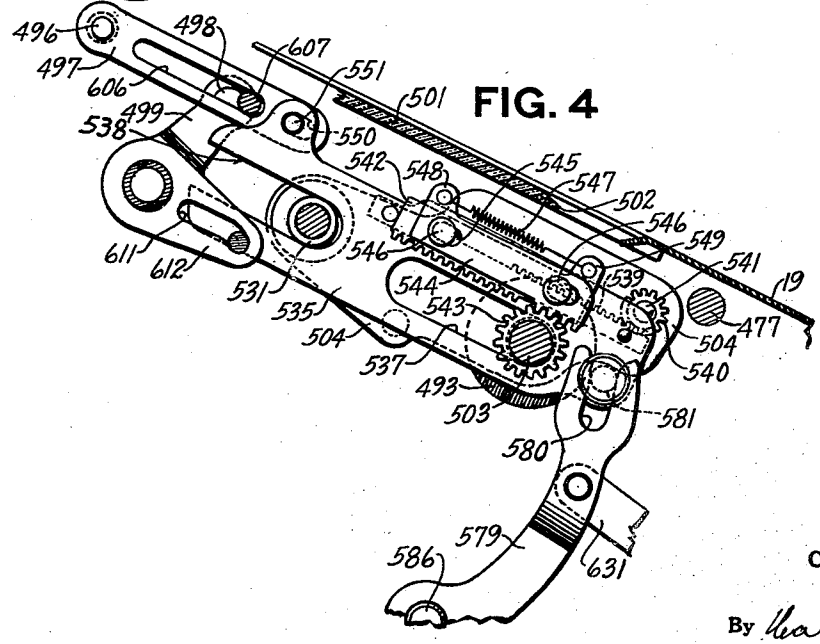


FIG. 4



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FIG. 5

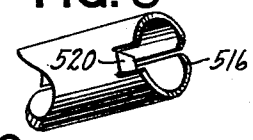


FIG. 6

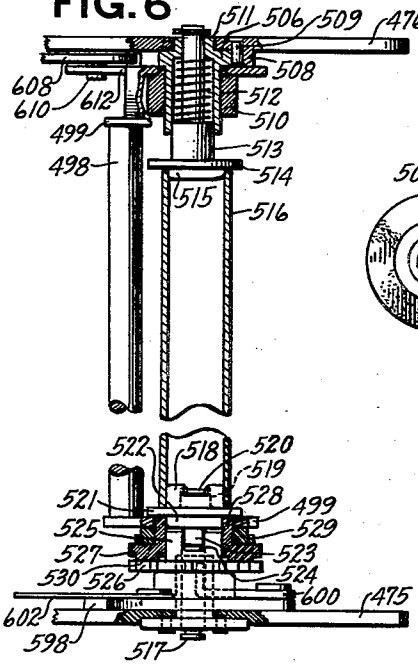


FIG. 7

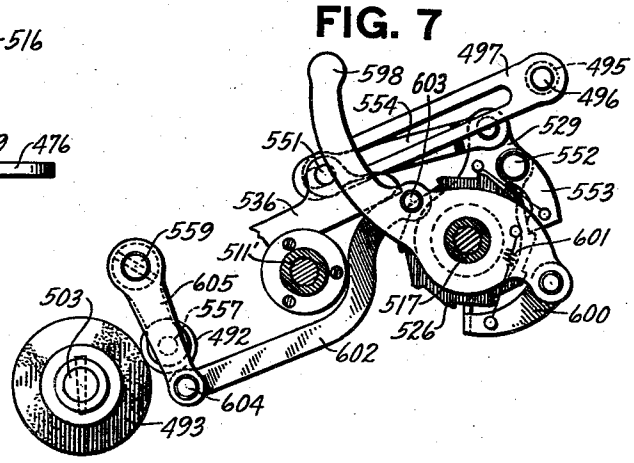
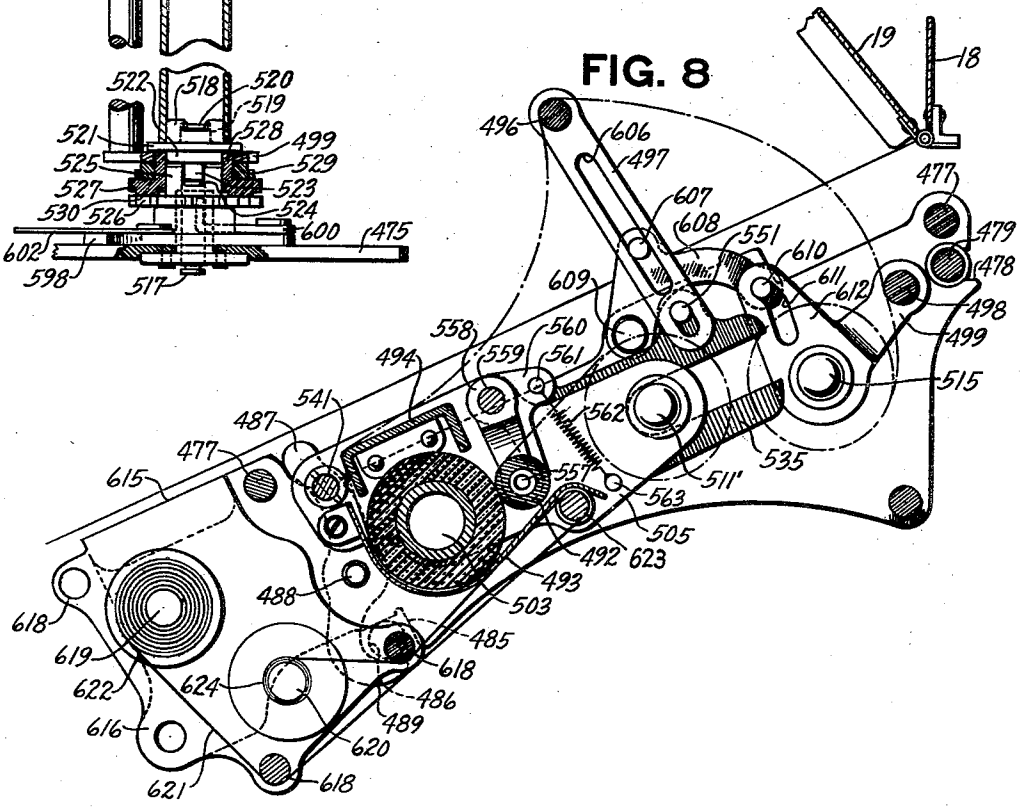


FIG. 8



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Patented July 30, 1940

2,209,773

UNITED STATES PATENT OFFICE

2,209,773

CASH REGISTER

Charles W. Green, Dayton, Ohio, assignor to The National Cash Register Company, Dayton, Ohio, a corporation of Maryland

Original application April 9, 1936, Serial No. 73,449, which is a division of application Serial No. 525,630, March 27, 1931. Divided and this application December 4, 1937, Serial No. 178,014

7 Claims. (Cl. 197—133)

This invention relates to cash registers and particularly to the type of machines capable of printing upon a detail strip a record of each transaction entered in the machine, and is a division of the application for United States Letters Patent of Charles W. Green, Serial No. 73,449, which was filed April 9, 1936, and which issued as Patent No. 2,187,200 on January 16, 1940. Application Serial No. 73,449 is a division of an application of Charles W. Green, Serial No. 525,630, filed March 27, 1931, which issued on December 18, 1936, into United States Letters Patent No. 2,063,091.

An object of this invention is to provide a novel record strip supporting frame carrying means to shift and feed the record strip independently of said frame.

Another object of this invention is to provide a novel means to move the record strip into and out of printing position and to feed the same to properly space the printing thereon.

With these and incidental objects in view, the invention includes certain novel features of construction and combinations of parts, the essential elements of which are set forth in the appended claims, and a preferred form or embodiment of which is hereinafter described with reference to the drawings which accompany and form part of this specification.

Of said drawings:

Fig. 1 is a general view of the printer for effecting printing upon the record strip.

Fig. 2 is a right-hand side view of the printer showing the operating mechanisms associated therewith.

Fig. 3 is a sectional view taken substantially on line 3—3 of Fig. 1.

Fig. 4 is a sectional view showing the paper shifting mechanism associated with the record strip printer.

Fig. 5 is a perspective view of a portion of the spool around which the record strip is wound.

Fig. 6 is a cross-sectional view showing the mechanism associated with the storage roll for the record strip.

Fig. 7 is a sectional view taken substantially on line 7—7 of Fig. 1, showing the manual feeding mechanism for the record strip.

Fig. 8 is a sectional view taken substantially on line 8—8 of Fig. 1, showing certain parts in adjusted position when the mechanism is conditioned for replenishing or removing the record strip.

General description

Described in general terms, this divisional application relates particularly to record strip printing, feeding, and shifting mechanism.

A record strip printing mechanism is provided in the illustrated machine and is positioned at the top of the cabinet. The various items entered in the machine may be viewed from the record strip through a window provided in the top of the cabinet. This window is so provided that autographic notations may be made upon the record strip adjacent the printed items. This mechanism is of such a nature that the record strip is first shifted from normal position to bring the proper portion thereof over the item type carriers, when a printing impression will then be made thereon. The paper is then shifted in the reverse direction and advances one step to present a new surface to be written and printed upon.

Detailed description—frame and cabinet

The record strip mechanism is mounted between two supporting frames 13 and 14 (Fig. 1) suitably secured to the machine base shown in the parent case and in the Green Patent No. 2,063,091. The mechanisms contained in this machine are enclosed by a cabinet 18 (Fig. 2), which has hinged thereto a flat lid 19 so that access may be had to the printing mechanism for removing the printed record strip and also for replenishing the paper supply.

Operating mechanism

The power is imparted to various mechanisms of the machine by a main driving shaft 20 (Fig. 2), which is driven either by an electric motor or by a hand-operated crank, as shown in the above-mentioned Green Patent No. 2,063,091. Shaft 20 is given one complete rotation at each operation of the machine.

Printing mechanism

The mechanism for effecting printing upon the record strip is mounted in unitary supports and is so constructed that it may be readily placed in the machine or removed therefrom as a unit. This mechanism is adapted to print from both the item type carriers 377 and from each of the totalizers and special counters mounted in a reel.

Referring more particularly to Figs. 1 to 3 and to Fig. 8, it will be seen that the printer is provided with two side frames 475 and 476 (Fig. 1). To rigidly hold these side frames in proper spaced relationship, three tie rods 477 (Figs. 1 and 8) are provided. Each side frame is provided with a slot 478 (Fig. 8) near the top rearward end thereof. These slots 478 are adapted to engage a supporting rod 479 journaled in intermediate supporting frames 13 and 14 (Fig. 1). Rod 479 has formed therein a pair of peripheral grooves for receiving a reduced portion of each slot. A collar 480 (Fig. 1) is pinned to rod 479 near the left-hand end thereof. The inner end of the collar lies adjacent the groove provided in rod 479 for receiving the slot 478 provided in

side frame 476. A spacing collar 482 is also pinned to rod 479 and extends inwardly from supporting frame 14. The inner end of the collar 482 is spaced to the right of the groove for frame 475 a distance equal to the thickness of frame 475. It will be noted that the inner end of each slot 478 is substantially circular in form, the diameter of which is substantially the same as that of rod 479.

From the construction of the parts just described, it is clear that when it is desired to assemble the printer frame in the machine proper, it is only necessary to insert the reduced portion of the slots onto the grooves formed in rod 479 and then slide the printer frame slightly to the right so that the enlarged portions of the slots will embrace rod 479. This movement is stopped when side frame 475 engages the inner end of spacing collar 482.

In order to prevent any lateral movement of the printer frame after it has been placed on rod 476, a manually operable latch 481 (Fig. 1) is provided. This latch is pivoted on the outer side of frame 476 near the top rearward end thereof, and is provided with a hook portion having a thickness substantially equal to the width of one of the peripheral grooves. Thus, it is seen that after the printer frame has been placed on rod 479 and slid to the right in the manner just described, latch 481 is moved downwardly to bring the hooked portion thereof into the peripheral groove adjacent side frame 476, as seen in Fig. 1. The printer frame is thus positively locked against lateral movement by the latch 481 and also against any movement away from rod 479 by virtue of the enlarged portions of slots 478 embracing shaft 479 proper. As seen in Fig. 2, a comparatively large notch 483 is provided at the lower forward end of side plate 475. A similar notch 485 (Fig. 8) is provided in the lower side of side frame 476. These notches receive supporting studs 484 and 486 respectively, projecting from supporting frames 14 and 13. In order to prevent any rocking movement of the printer about rod 479, a latch 487 (Fig. 8) is provided. This latch is pivoted to side frame 476 at 488 and is provided with a hook portion 489 at the lower end thereof, which is adapted to embrace stud 486 projecting inwardly from frame 13. Thus, it is seen that the forward end of the printer frame is rigidly held in position.

The mountings for the record strip 490 are shown more clearly in Figs. 2 and 3, wherein it will be seen that the record strip 490 is trained from supply roll 491 over a compression roll 492, thence around platen roll 493 and over a writing table 494, then rearwardly over a sleeve 495 mounted on a rod 496 supported by a pair of links 497, thence over a rod 498 supported by a pair of arms 499, and thence around the receiving or storage roll 500. A paper shifting and feeding mechanism is provided, which is so constructed that it will shift the record strip from normal position to bring the autographic portion thereof to be printed upon to a position directly beneath the platen to receive a printing impression from the type carriers. The record strip is then shifted in the reverse direction and advanced one space so as to present a new surface to be written and printed upon. In Fig. 3 it will be seen that the detail strip is located directly below lid 19 of the cabinet. This lid is provided with a window 501 so that several of the preceding items recorded on the record strip may be viewed. The window 501 is provided with an opening 502 so that autographic notations may be made upon the detail strip adjacent the printed items. The platen 493 (Fig. 3) is mounted on an elongated sleeve embracing shaft 503 which is supported by a pair of arms 504 and 505 (Figs. 1 and 8) journaled respectively on the enlarged portions of studs 531 and 532 provided in the printer side frames 475 and 476, which studs also support the supply roll 491.

The receiving or storage roll is supported in the printer frame by the mechanism shown in Fig. 6, wherein it will be seen that the reduced portion of a tubular stud 506 is fitted in an aperture provided in side frame 476. Stud 506 is provided with a flange 508 which is fastened to the side frame 476 by rivets 509 or by any other suitable means. A grooved collar 510 embraces the inner end of stud 506, and forms a bearing for the arm 499 located toward the left of the printer, which, it will be remembered, is one of the arms which supports rod 498. A plunger 511 is supported at one end within the reduced portion of tubular stud 506. Near its inner end, plunger 511 is provided with an enlarged cylindrical surface 513, which is slidably received within the tubular portion of stud 506. A spring 512 is mounted on the reduced portion of plunger 511. The inner end of plunger 511 is provided with an enlarged flange 514 and a reduced tapered portion 515 which receives one end of core 516 about which the detail strip is wound. Mounted in suitable bearings provided in side frame 475 is a long stud 517. The inner end of stud 517 is provided with an enlarged cylindrical shoulder 518 which is slotted at 519 to receive an inwardly extending projection 520 formed at one end of core 516. Adjacent shoulder 518, stud 517 is provided with a flange 521. Adjacent flange 521 is a cylindrical shoulder 522, and, adjacent the latter, stud 517 is formed with a key portion 523 which engages in a slot 524 provided in the hub 525 of a ratchet wheel 526. A second ratchet wheel 527 is journaled on hub 525 of ratchet 526 and also on shoulder 522 of stud 517. The arm 499, located toward the right-hand side of the printer, is journaled on a hub 528 of ratchet 527. Also journaled on hub 528, between arm 499 and ratchet 527, is an arm 529, which has pivoted thereto a feed pawl 553, as shown more clearly in Fig. 7. The inner end of hub 528 (Fig. 6) of ratchet 527 bears against the outer side of flange 521. Thus, in order to insert a core 516 in a printer frame, it is only necessary to engage one end thereof on the reduced portion 515 of plunger 511 and force plunger 511 outwardly against the tension of its spring 512 until the other end of core 516 clears shoulder 518 of stud 517. That end may then be fitted on shoulder 518 and the projection 520 provided in that end of the core positioned within slot 519 provided in shoulder 518. It will be noted that the outer side of ratchet wheel 527 is provided with a circular bearing surface 530 which engages the inner side of ratchet 526. Spring 512, associated with stud 506, urges core 516 against flange 521, which, in turn, engages the inner end of the hub 528 of ratchet wheel 527 and consequently surface 530 of ratchet wheel 527 is spring-urged against ratchet wheel 526. Thus it is seen that, upon movement of ratchet wheel 527, ratchet wheel 526 will also be actuated, due to the friction between their concontacting surfaces. The supporting means for the core carrying the supply roll is somewhat similar to that shown in Fig. 6, in that a spring-

pressed plunger 511' (Figs. 3 and 8) is provided within the tubular stud 531 fixed to frame 476. The support for the other end of the core, however, simply comprises the stud 532 (Fig. 1) which is provided with a flange 533 and a cylindrical shoulder 534 similar to that provided on stud 517 for the core 516 of the receiving roll.

The mechanism for shifting and feeding the detail strip will now be described in detail. Referring to Figs. 1 and 4, it will be seen that a slidable member 535 is provided with a pair of elongated slots 537 and 538 for receiving platen shaft 503 and stud 531, respectively. A similar slidable member 536 is provided at the other side of the printer and also is formed with a pair of similar slots, one of which also receives the platen shaft 503 and the other the stud 532. A rack 539 is attached to the upper side of each slidable member 535 and 536, the rack meshing with a related pinion 540 pinned to a shaft 541. Shaft 541 is journaled in the forward ends of arms 504 and 505 which support the platen shaft 503. This mechanism is provided to compel slidable members 535 and 536 to move in unison. As shown more clearly in Fig. 4, slidable member 535 has also attached thereto a rack 542 which is normally out of engagement with a pinion 543 fixed to platen shaft 503. A short rack 544 is positioned adjacent rack 542 and is provided with a pair of slots 545 for receiving studs 546 carried by slidable member 535. Rack 544 is normally in engagement with pinion 543 attached to shaft 503, as shown in Fig. 4. Racks 542 and 544, by virtue of the pin and slot connection just described, are so arranged that an open tooth space is normally provided between the two racks. A spring 547 is mounted at one end to a stud provided on an upwardly extending projection 548 formed at the rearward end of rack 544 and at the other end to a stud provided on a projection 549 extending from the forward end of rack 542, which rack, it will be remembered, is fixed to slidable member 535. This spring tends to maintain racks 542 and 544 in extended position, as shown in Fig. 4. It will also be seen that a slot 550 is provided near the forward end of each link 497. One of said slots receives a stud 551 provided on slidable member 535, while the other of said slots receives a similar stud 551 provided on slidable member 536. As shown in Fig. 7, the arm 529 has pivoted thereto at 552 the spring-urged pawl 553 which engages ratchet wheel 527 (Fig. 6). A link 554 is pivoted at its rearward end to arm 529, while its forward end is pivoted to a stud 551 provided in slidable member 536. In Figs. 1, 3, and 8, it will also be seen that pressure roll 492 is fixed to a rod 557 which is supported by a pair of arms 558 pivotally mounted on a rod 559 journaled in the arms 504 and 505 previously described. Fixed to rod 559 adjacent arms 504 and 505 are a pair of depending arms 560. Each arm 560 is provided with a stud 561 to which one end of spring 562 is attached. The other end of each spring 562 is fixed to a related stud 563 provided in arms 504 and 505. Thus it is seen that pressure roll 492 is spring-urged into engagement with platen 493.

From the construction of the parts just described, it is seen that when slidable members 535 and 536 (Fig. 4) are moved forwardly in a manner to be described hereinafter, due to the friction existing between the platen and pressure roll, the short rack 544 will be held stationary until slidable member 535 has been moved sufficiently to cause studs 546 to traverse the length of slots 545, when racks 542 and 544 will move as a unit, thereby rotating platen 493 in a clockwise direction as viewed in Fig. 4. Link 497 will also be held stationary until both racks move together, due to the pin and slot connection 551 and 550 between the slidable members 535 and 536 and links 497. However, when this lost motion has been taken up, links 497, which, it will be remembered, support rod 496, will also be carried forwardly by the movement of slidable members 535 and 536, with the result that sufficient slack is provided in the detail strip to permit platen 493, operating in conjunction with pressure roll 492, to shift the paper around the platen to bring the proper portion thereof into printing position.

When the paper has been shifted to this position, a printing impression will be effected thereon from the type carriers in a manner which will be described in detail hereinafter. It will also be noted that, due to the connecting link 554 (Fig. 7) between slidable member 536 and arm 529 which carries the pawl 553, the latter will be moved forwardly to engage the next adjacent tooth on ratchet wheel 527 (Fig. 6) when the slidable members 535 and 536 (Figs. 4 and 7) are actuated to shift the paper to printing position. It will also be seen that when short rack 544 has been moved out of engagement with pinion 543, spring 547 will extend the racks, causing a space equal to substantially the width of one tooth to be provided between racks 542 and 544. Now, upon movement of slidable members 535 and 536 in the reverse direction, pinion 543 will be moved a greater distance in the reverse direction than it was moved when the paper was shifted to printing position. This is due to the fact that upon the return movement of racks 542 and 544, they are extended, as stated before, so that the last tooth on rack 544 will engage the second tooth on pinion 543 from that engaged by the first tooth on rack 542.

When the parts are thus moved to normal position, pawl 553 will rotate ratchet 527 a distance equal to substantially the length of one tooth space of ratchet wheel 527, which movement will be transmitted to core 516 of the storage roll through the friction drive provided between ratch 527 and ratchet 526. The friction connection between ratchets 527 and 526 is provided to compensate for the variation in the size of the storage roll, thus insuring a constant feed of the record strip. From the foregoing description, it is clear that, by virtue of the construction of racks 542 and 544, a constant amount of paper will be taken from the supply roll at each operation of the machine, but, due to the fact that the receiving roll is constantly increasing in size, a progressively greater amount of paper would tend to be wound thereon. Since this amount of paper becomes greater than that paid off from the supply roll, the paper would be severed if no compensating mechanism were provided. For this reason, applicant has provided the friction clutch between ratchets 526 and 527, so that when binding of the paper occurs by the gripping action of friction roll 492 and platen 493 after a sufficient amount has been paid off the supply roll, slippage will occur between ratchet 527 and ratchet 526, with the result that only an amount of paper equal to that paid off the supply roll will be wound on the receiving roll. This amount may be regulated so as to provide the desired space between the printed items.

Referring to Figs. 2, 3, and 4, it will be seen that a cam 565 and its companion cam 565' are attached to a gear 566 loosely mounted on driving shaft 20. Gear 566 meshes with a pinion 738 fixed to a shaft 735 journaled in supporting frames 13 and 14. Shaft 735 has pinned thereto a second pinion 736 (Fig. 2) which meshes with a gear 159 fixed to the main driving shaft 20. Thus it is seen that, upon operation of main driving shaft 20, movement will be imparted to cams 565 and 565' to actuate the mechanisms for shifting and feeding the record strip and also the mechanism for effecting printing thereon. Cams 565 and 565' engage rollers 567 and 568 provided on arms 569 and 570, respectively, of a segmental gear 571 pivoted on shaft 753. Segmental gear 571 meshes with a segmental gear 572 which is loosely mounted on sleeve 387 provided on shaft 386. The upper portion of segment 572 is provided with a cam slot 574 which receives a stud 575 provided on the lower arm 576 of a bell crank lever 577 pivoted on a trunnion 578 fixed to frame 13. The upper arm 579 of bell crank lever 577 is provided with an open slot 580 which receives a laterally extending stud 581 fixed to the slidable member 535 as shown in Figs. 1 and 4. A laterally projecting stud 582 is also provided on segment 572, to which is pivoted the rearward end of a link 583. The forward end of link 583 is pivoted on a stud 584 provided at the upper end of an arm 585 fixed to a shaft 586. Shaft 586 is journaled in the frames 13 and 14, as is clearly shown in Fig. 1. Intermediate the ends of arm 585 (best shown in Fig. 3) is an inwardly extending stud 587 which engages in an open slot 588 provided in the lower arm 589 of a bell crank lever 590 (Fig. 1) pivoted on an inwardly extending stud 590' fixed to supporting frame 13. The upper rearwardly extending arm 591 of lever 590 is bifurcated to receive platen shaft 503. Also pinned to shaft 586 is a second arm 592 (Fig. 2) having a stud 593 in axial alinement with stud 587 on arm 585. Stud 593 operates in an open slot in the lower arm 594 of a lever 595 similar to that provided at the lower end of lever 590. Lever 595 is pivoted on a stud 595' extending inwardly from frame 14 and has an arm 596 which also is provided with a bifurcation 597 for receiving the platen shaft 503. The two arms 590 and 595 are provided to equalize the movement of the platen 493. Thus it is clear that when cams 565 and 565' are operated by gear 566, segment 572 will be rocked in a counterclockwise direction as viewed in Fig. 2, with the result that bell crank 577 will also be rocked in a counter-clockwise direction which, through its connection with sliding member 535, will move the same forwardly to shift the record strip 490 to printing position. At this time, stud 575 will enter the dwell 574' of cam slot 574 and the record strip will be held in shifted position. Dwell 574' is provided so that the record strip 490 will be held stationary during a printing operation. As segment 572 is rocked in a counter-clockwise direction, as aforesaid, shaft 586 will also be rocked in a counter-clockwise direction due to the engagement of link 583 with arm 585. This motion is transmitted to the platen shaft by levers 590 and 595 respectively. The parts are so constructed that when the paper has been shifted to printing position and stud 575 has entered the dwell 574' in slot 574, platen 493 will also have been rocked downwardly to a position slightly above the type carriers. At substantially the time that the record strip 490 has been brought to rest in shifted position, further movement of segment 572 will cause platen 493 to be brought into engagement with the type carriers, thereby effecting a printing impression upon the record strip. When segmental gear 572 is rocked in the reverse direction, it is seen that, because of the dwell 574' provided in cam slot 574, the platen will be moved out of engagement with the type carriers before the record strip 490 will be shifted in the reverse direction. When the cam portion of slot 574 reaches stud 575, the record strip will be shifted in the reverse direction and at the same time the platen will be restored to normal position.

At times it is desirable to feed the record strip manually to wind the record material upon the receiving roll. To this end a manually operable lever 598 is provided. As shown in Figs. 2 and 7, lever 598 projects through a slot (not shown) in lid 19 of the cabinet, so that the record strip may be fed without requiring the lid 19 to be opened. As shown in Figs. 6 and 7, lever 598 is pivoted on stud 517 in close juxtaposition to side plate 475. The lower end of lever 598 has pivoted thereto a pawl 600 which is urged into engagement with ratchet 526 by a spring 601. A link 602 is pivoted at its rearward end to a stud 603 provided intermediate the ends of lever 598. The forward end of link 602 is pivoted at 604 to a depending arm 605 fixed to rod 559. Rod 559, it will be remembered, has also fixed thereto the depending arms 560 (Fig. 8) which normally urge the pressure roll 492 into engagement with platen 493. Thus it is seen that by grasping lever 598 and urging the same rearwardly, pawl 600 will engage the teeth of ratchet 526 to rotate core 516 (Fig. 6) of the receiving roll, thus causing paper to be wound thereon. At the same time the rearward movement of link 602 moves pressure roll 492 out of engagement with the platen so that the tension between roll 492 and platen 493 is destroyed, and thus the record strip may be paid off from the supply roll without any binding action that normally exists between the pressure roll and the platen.

In order to facilitate the removal and replenishing of the record paper in the printer, the following mechanism is provided. Referring to Figs. 3, 4, and 8, it will be seen that the link 497, which is pivotally connected to slidable member 535, is provided with an elongated slot 606 intermediate its ends for receiving a stud 607 fixed to the upper portion of an arm 608 (Fig. 8) pivoted to the printer side frame 476 at 609. The rearward end of arm 608 is provided with a laterally extending stud 610 which operates in a slot 611 provided in an arm 612, integral with an arm 499, which, it will be remembered, is one of the arms supporting rod 498 over which the record strip 490 is trained before passing onto the receiving roll. By the connections just described, it is seen that by simply lifting rod 496, arm 608 will be cammed upwardly, causing the stud 610 thereon to rock arms 499 and supporting rod 498 rearwardly, thereby bringing all of the parts just described to the position shown in Fig. 8. When the parts are in this position, it is clear that the paper may be severed and both the supply and receiving rolls readily removed from their mountings.

Ribbon mechanism

The ribbon mechanism for the detail record strip printer is mounted on a bracket 615 which is fastened to the forward end of the printer side

frame 476 by screws, rivets, or any other suitable means, as shown in Figs. 1, 2, 3, and 8. Spaced from side frame 476, bracket 615 is formed with a depending portion 616 for supporting a number of the parts associated with the ribbon mechanism. The lower end of depending portion 616 is rigidly secured to side frame 476 by suitable bracing rods. Spaced from depending portion 616 of bracket 615 is a plate 617 (Fig. 1), which is integrally secured to depending portion 616 by tie rods 618. Referring to Fig. 8, it will be seen that the inking ribbon 621 extends from roll 622 around tie rod 618, thence around rod 623 provided in platen supporting arms 504 and 505, thence beneath tie rod 618 and around roll 624. Rolls 622 and 624 are supported on shafts 619 and 620 respectively, journaled in depending portion 616 and plate 617. To facilitate movement of the ink ribbon, tie rods 618 and rod 623 may be provided with frictionless rollers. The ink ribbon feeding mechanism is of such a construction that when the ribbon has been completely unwound from one roll, the mechanism will be automatically shifted so as to rewind the ribbon on that roll and pay it off from the other roll. The mechanism for feeding the ribbon will now be described in detail.

Referring particularly to Figs. 1 and 3, it will be seen that a bell crank lever 625 is formed with a bail-like portion 626 which is journaled on a rod 627 fixed to end plate 476 and depending portion 616 of bracket 615. One arm of this bail extends upwardly between side frame 476 and portion 616 of bracket 615 while the other arm thereof is positioned a short distance to the right of depending portion 616, as shown in Fig. 1. It will be seen from Figs. 1 and 3 that the lower arm 628 of bell crank lever 625 has fixed thereto a pin 629 which operates in an elongated slot 630 provided near the forward end of link 631. The rear end of link 631 is pivoted at 632 to the upper arm 579 of bell crank 577. Integral with bail 626 is an arm 633 extending upwardly and rearwardly from 627. Arm 633 has pivoted to its upper end at 634 a downwardly and rearwardly extending arm 635 carrying a pin 636. Arm 635 is normally urged downwardly by a spring 637. Loosely pivoted on rod 627 is an upwardly and rearwardly extending arm 638 which has pivoted at the upper end thereof at 639 a two-arm pawl 640. The upper arm 641 of pawl 640 engages a ratchet wheel 642 fixed to shaft 619 which supports ribbon roll 622. The lower arm 643 of pawl 640 is adapted to engage ratchet 644 fixed to shaft 620 supporting the ribbon roll 624. A comparatively broad notch 640' is provided at the top of pawl 640 for receiving pin 636 carried by arm 635. The upper end of arm 638 is provided with a nose portion 645 which is adapted to be engaged at either side thereof by the pin 636 on arm 635. Fixed to ratchet 642 is a serrated disc 646 which is engaged by a nose portion 647 provided on arm 648 of two-arm pawl 649. Also fixed to ratchet 644 is a serrated disc 650 which receives the other arm 651 of holding pawl 649. Holding pawl 649 is provided with an open slot 652 at its lower end which straddles rod 627 as shown in Fig. 3. A spring 653 urges pawl 649 upwardly so that arms 647 and 651 thereof engage discs 646 and 650 respectively. When the parts are in the position shown in Fig. 3 and segmental gear 572 is operated as was described heretofore, it will be seen that bell crank lever 625 will be rocked about its pivot first in a clockwise direction and then in a counter-clockwise direction. When bell crank lever 577 is rocked by cam 574 provided in segmental gear 572, link 631 obviously will first be moved downwardly until the end portion of slot 630 therein engages the pin 629 provided at the lower end of arm 628 of bell crank 625, when the latter will be rocked in a clockwise direction, with the result that arm 633, carrying arm 635 on the upper end thereof, will also be rocked in a clockwise direction. By the engagement of pin 636 with nose 645 of arm 638, the latter will be moved downwardly, thus causing the hook provided in arm 641 of pawl 640 to actuate ratchet wheel 642 and thereby feed the ribbon an increment. When segmental gear 572 is moved in the reverse direction, the parts will be restored to normal position. From the construction of the parts just described, it will be seen that when the ribbon has been completely paid off from roll 624 and the machine is subsequently operated, binding of the ribbon will take place and ratchet wheel 642 will be held stationary. When this action takes place, pawl 640 will also be held stationary, but bell crank lever 625 will move on its pivot, with the result that pin 636 will be cammed around nose portion 645 of arm 638 and will be moved into position on the other side of nose portion 645 by spring 637. Spring 637 will also rock arm 643 of pawl 640 into engagement with ratchet wheel 644 and arm 641 thereof out of engagement with ratchet wheel 642. Now, when the machine is subsequently operated, roll 624 will be actuated by arm 643 of pawl 640 and ratchet wheel 644 attached thereto, to wind the ribbon around roll 624 and pay it off from roll 622 until the ribbon has been completely paid off from roll 622, when pin 636 will again be cammed around nose 645 and into the position shown in Fig. 3. Thus it is seen that an automatic ribbon reverse is provided which effectively feeds the ribbon at each operation of the machine, thereby presenting a fresh portion to the printing line each time the platen is brought into engagement with the type carriers.

While the form of mechanism herein shown and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the one form or embodiment herein disclosed, for it is susceptible of embodiment in various forms, all coming within the scope of the claims which follow.

What is claimed is:

1. In a machine of the class described, the combination with a printing mechanism, of a frame supporting a record strip; a rotatable platen mounted in said frame about which said record strip is trained; a pressure roll engaging said platen; a pair of relatively movable racks for rotating said platen to bring a portion of the record strip into printing position, the pressure of the roll on the platen creating a resistance so that one of said racks will first be held against movement, permitting the second rack to move relatively thereto without imparting any movement to said platen, said racks then being moved as a unit to rotate said platen in one direction; means for extending said racks; and means for actuating said racks in the reverse direction to rotate said platen in the reverse direction a greater distance than it was rotated in the first-mentioned direction, to feed said record strip one step.

2. In a machine of the class described, the combination with a printing mechanism, of a frame supporting a record strip; a platen rockably supported in said frame; a gear fixed to said platen; a rack meshing with said gear; a second rack having teeth located to mesh with said gear

subsequently to the teeth on said first mentioned rack, said racks being so connected that normally a space will be left between the teeth thereof; a compression roll engaging said platen; a slidable member supporting said racks and rockable with said platen; means for actuating said slidable member, said roll engaging said platen and creating a drag thereupon so that upon the initial movement of said slidable member, said first mentioned rack will be held stationary until said second mentioned rack has been moved a distance equal to the space between said teeth, when said racks will then move in unison to rotate said platen to shift said record strip to printing position; and means for extending said racks when said first mentioned rack is moved out of engagement with said gear, said racks remaining in such relative positions when actuated in the reverse direction, thereby rotating said platen a greater distance in the reverse direction than it was rotated to shift the paper to printing position, thereby advancing said record strip one step.

3. In a machine of the class described having a printing mechanism, the combination of a frame supporting a record strip; a platen mounted in said frame and reversibly rotatable to feed the record strip forwardly from a normal or starting position to a printing position and back past the starting position to line-space the strip after an impression has been made thereon; a gear connected to said platen; means rockable with said platen and operable to rotate the platen to feed the strip forwardly and backwardly and including a member shiftable forwardly and backwardly, a rack fastened to said member for movement therewith, and another rack normally engaging said gear having a lost-motion connection with said member so as to have limited movement relative to said first-mentioned rack; a pressure roll cooperating with said platen to create a drag and retard the movement of said other rack to thereby cause said other rack to move relatively to the first-mentioned rack the extent of said lost-motion connection to provide a shorter effective drive for the platen during the forward movement of the member than during the return movement and means to restore the racks to their original relative position before the member is moved backwardly to cause the racks to move the strip past the starting position on the backward movement of said member.

4. In a machine of the class described, the combination with a printing mechanism, of a frame supporting a record strip; means to feed the record strip variable distances; a pair of relatively movable toothed members for moving the feeding means to feed the record strip independently of the frame to position the strip to be printed upon by the printing mechanism, and then back toward its original position; means cooperating with the feeding means to create a drag and retard one of said toothed members to cause relative movement between toothed members without moving the feeding means, said toothed members thereafter jointly operable to operate the feeding means to move the strip toward printing position; means for moving the toothed members to operate the feeding means in both directions; and resilient means to cause relative movement between the toothed members to restore the toothed members to their original extended positions so that the toothed members, when moved by the moving means, will operate the feeding means to impart a greater movement to the record strip when moved in the reverse direction than when they operate the feeding means to move the strip to printing position.

5. In a machine of the class described, the combination with a printing mechanism, of a frame supporting a record strip; means to feed the record strip; a pair of yieldably connected and relatively movable members for operating the feeding means to move the record strip independently of the frame to position it to be printed upon by the printing mechanism and then in the reverse direction; means cooperating with the feeding means to create a drag and retard movement of one of said members prior to moving the strip to printing position; means to operate the members in both of said directions; and means to extend said members through said yieldable connection to variably cooperate with the feeding means so that a greater movement will be imparted to the record strip when the members move the feeding means to feed the slip in the reverse direction than when the members operate the feeding means to feed the strip to printing position.

6. In a machine of the class described having printing mechanism, the combination of a frame supporting a record strip; a rotatable platen rockably supported in said frame; a member rockable with said platen and shiftable relative thereto; means to shift said member; a pair of racks carried by said member and operable to rotate the platen to move the record strip from a starting position to a printing position and then return the strip past starting position to space the strip, one of said racks being fast to said member and the other being connected to the platen and having a lost-motion connection with said member, means cooperating with the platen to create a drag and retard rotation of the platen to thereby retard movement of said other rack until the slack between the said other rack and member due to the lost-motion connection is taken up to cause relative movement between said racks when the member is shifted to feed the strip to its printing position, and means to restore said other rack to its original position in relation to the member to restore the slack between the said other rack and member so that upon reverse movement of the member the strip is fed a longer distance in the return feed from printing position.

7. In a machine of the class described having a plurality of type carriers, the combination of a platen rockable to engage said type carriers to make an impression on a record strip and reversibly operable to feed the strip forwardly to bring a portion thereof from a normal or starting position to a position opposite said type carriers and then backwardly to move the portion of the strip past starting position to line-space the strip; a gear connected to said platen; means to operate the platen to feed the strip including a member rockable with said platen and having a forward and backward movement and a pair of relatively movable racks operated by said member, one of said racks normally engaged with the gear and the other rack normally disengaged from the gear, means cooperating with the platen to create a drag and retard movement of said one rack until said relative movement between the racks is completed, said one rack thereafter being operable to rotate the platen forwardly until the other rack engages the gear to jointly rotate the platen forwardly, and means to cause relative movement between two racks to restore the racks to their original relative positions before being

moved in the reverse direction to jointly rotate the platen backwardly a greater extent than the platen was rotated forwardly; means for rocking the platen into engagement with the type carriers; and means to shift the member forwardly and backwardly, said shifting means for the member and said platen rocking means being so timed in their operation that the strip is fed forwardly to the position opposite the type carriers as the platen is being rocked toward the type carriers, is retained stationary when the platen engages the type carriers, and is fed backwardly as the platen is being rocked away from the type carriers.

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