

July 31, 1934.

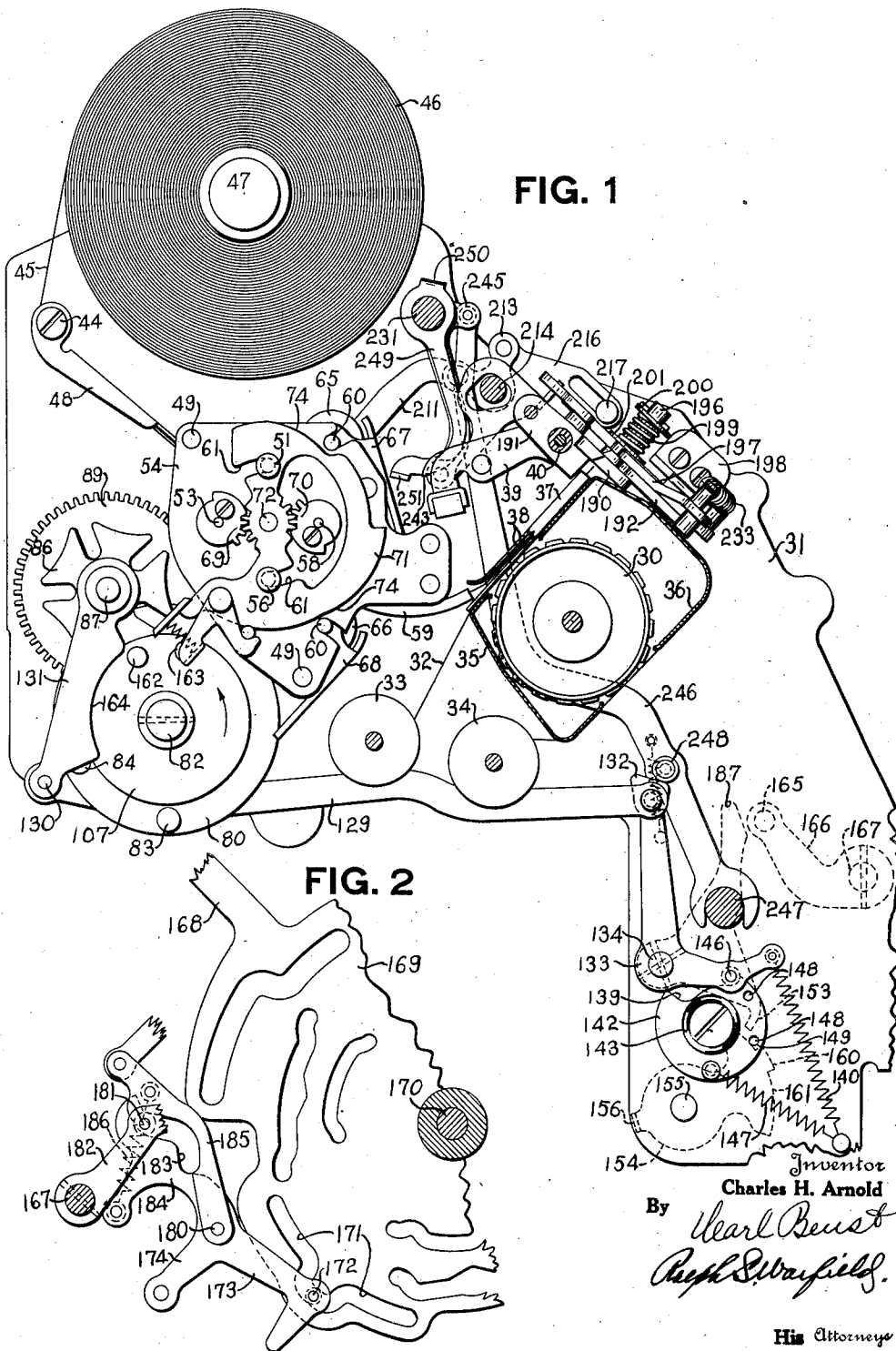
C. H. ARNOLD

1,968,669

PRINTING AND SEVERING MECHANISM FOR CASH REGISTERS

Filed May 4, 1929

5 Sheets-Sheet 1



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PRINTING AND SEVERING MECHANISM FOR CASH REGISTERS

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5 Sheets-Sheet 2

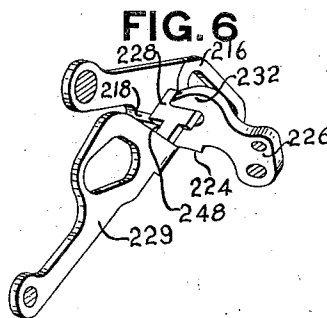
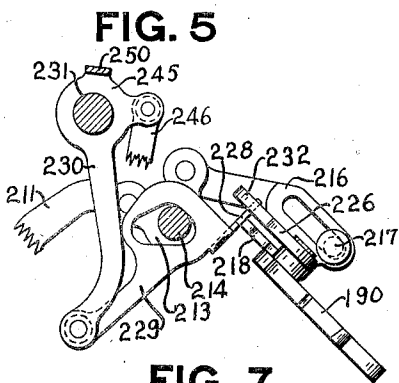
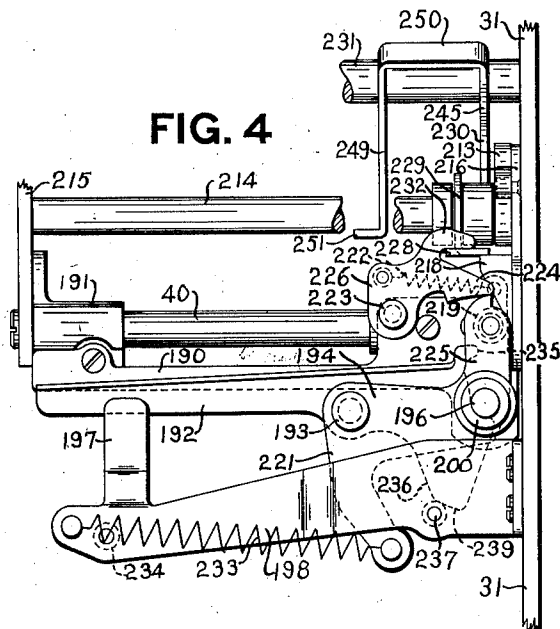
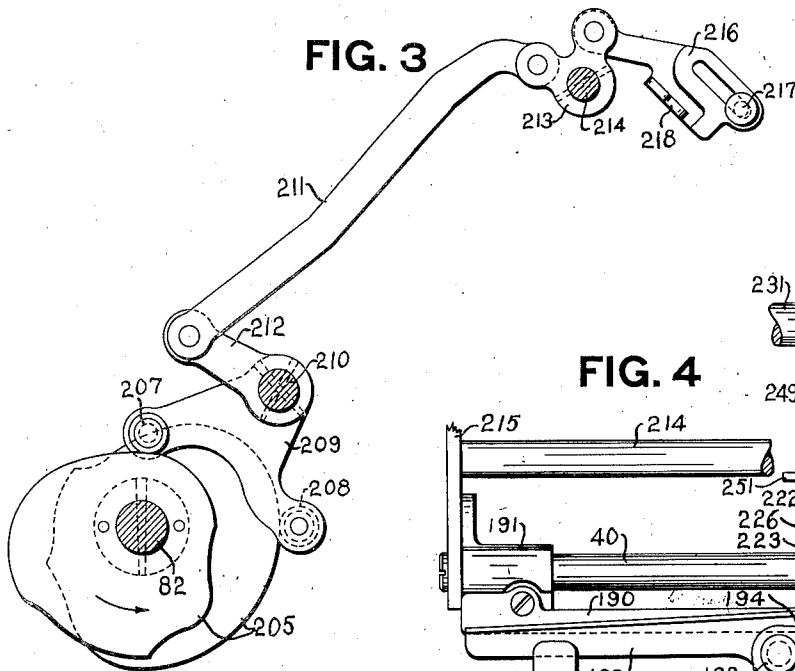


FIG. 7

THE JOHN DOE DEPARTMENT STORE			
Thank You.			
DATE	SERIAL NO.	AMOUNT.	TRG.
24 OCT -28	5907	\$9,911.99 A J.	96

DATE.	SERIAL NO.	AMOUNT.	TRG.
24 OCT -28	5907	\$9,911.99 A J.	

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5 Sheets-Sheet 3

FIG. 8

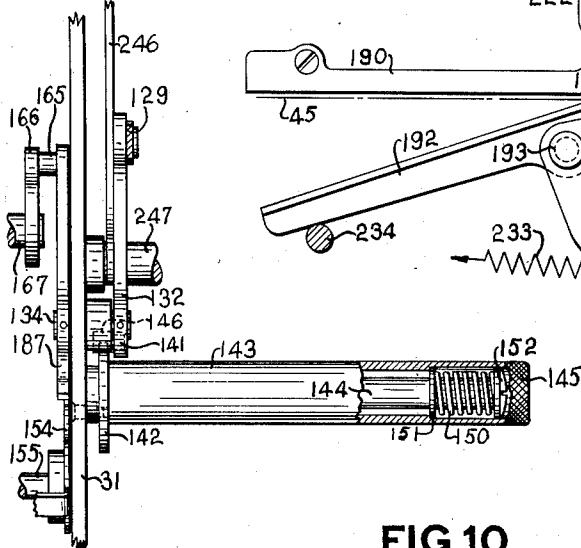


FIG. 9

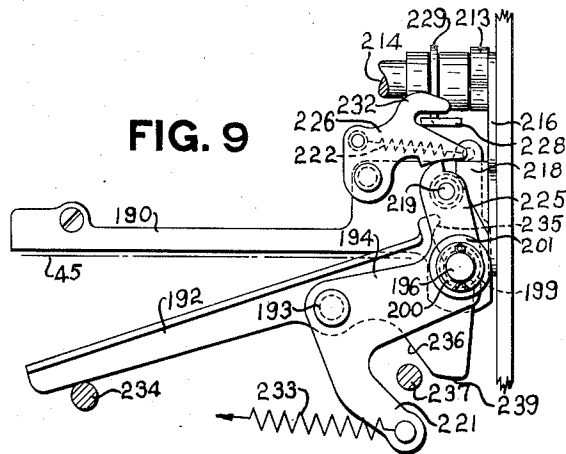


FIG. 10

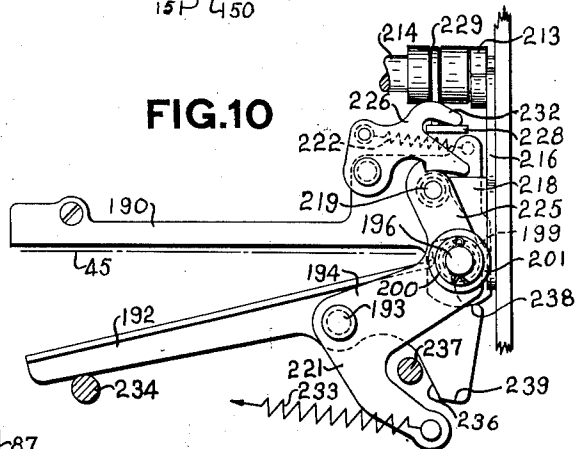
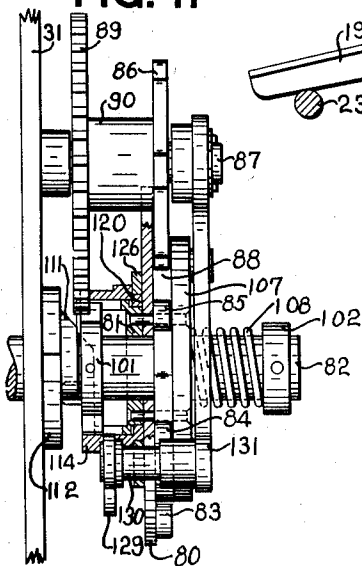


FIG. 11



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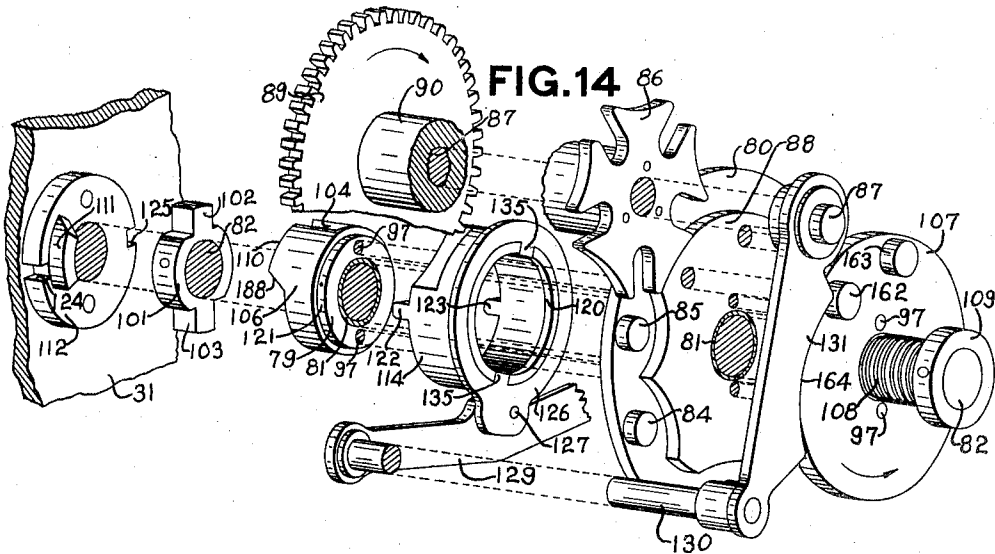
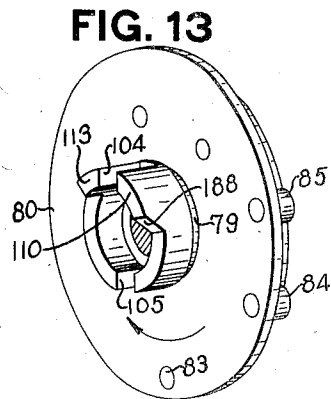
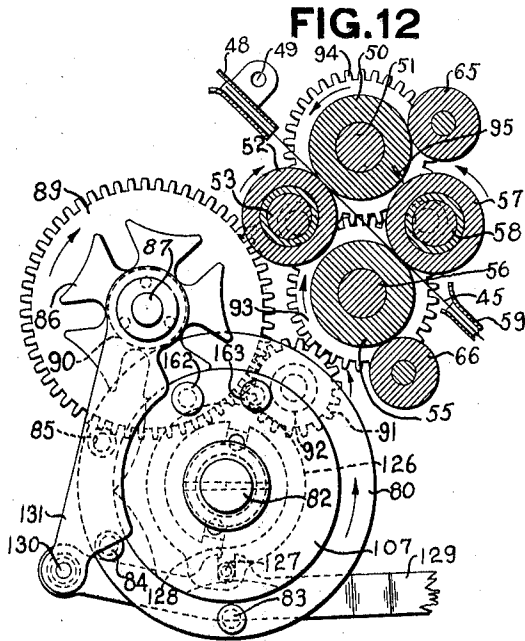
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5 Sheets-Sheet 4



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PRINTING AND SEVERING MECHANISM FOR CASH REGISTERS

Filed May 4, 1929

5 Sheets-Sheet 5

FIG. 15

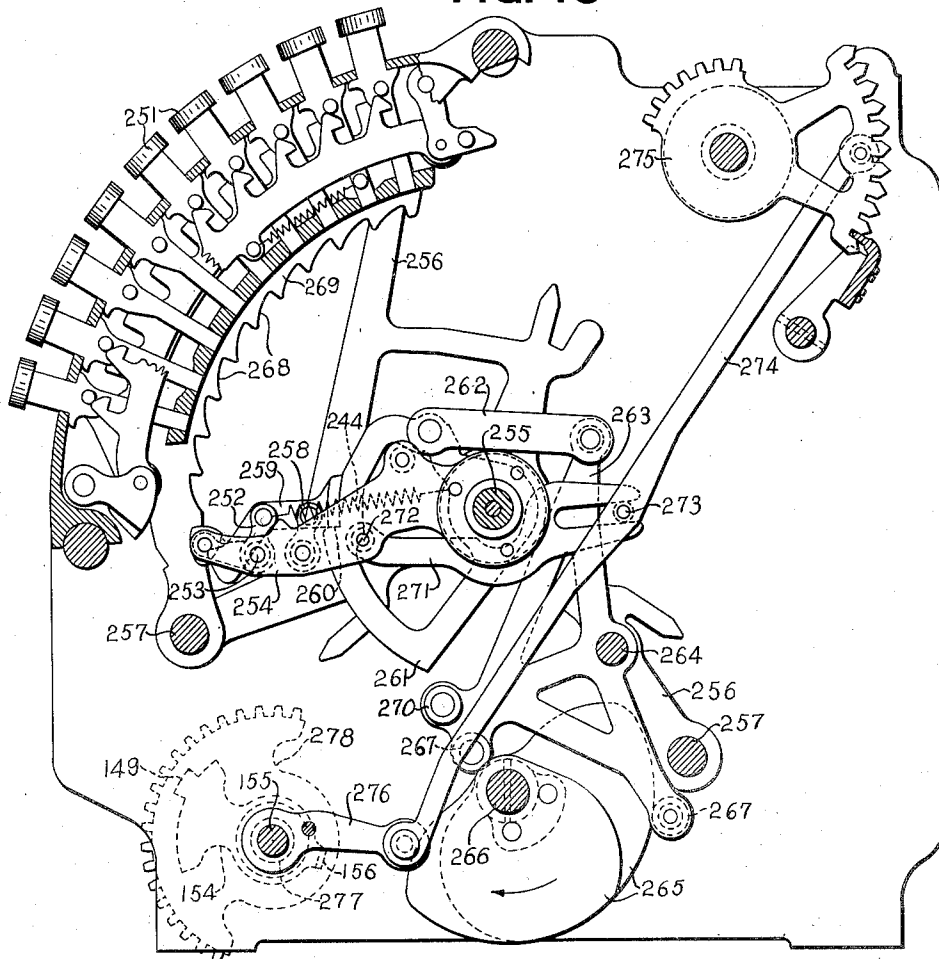
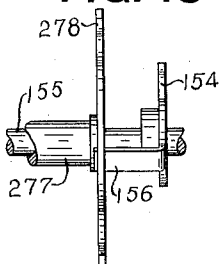


FIG. 16



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UNITED STATES PATENT OFFICE

1,968,669

PRINTING AND SEVERING MECHANISM
FOR CASH REGISTERSCharles H. Arnold, Dayton, Ohio, assignor to The
National Cash Register Company, Dayton,
Ohio, a corporation of Maryland

Application May 4, 1929, Serial No. 360,525

28 Claims. (Cl. 164-42)

This invention relates to registers and like machines, and is more particularly directed to improvements in the printing and severing mechanisms for such machines.

5 The printing device of the present invention is particularly adapted for use in connection with cash registers of the type disclosed in applica-
10 tions for Letters Patent of the United States, Serial Nos. 608,281 and 687,305, filed December 21, 1922 and January 19, 1924, respectively, by Bernis M. Shipley, Patent Nos. 1,817,883, and 1,865,147, issued on August 4, 1931 and June 28, 1932, respectively.

15 One object of this invention is to provide a printing mechanism with a novel scissors-motion severing device having a compound movement.

Another object is to provide a novel and simplified means to control a scissors-motion severing device.

20 A further object is to provide in combination with a printing mechanism, a novel record material feeding device, together with novel controlling means therefor.

25 Still another object is to provide a novel disabling means for the Geneva drive used in connection with the control device for the feed mechanism.

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

In the drawings:

Fig. 1 is a view in left elevation of the printing device, which is shown partly in section for clear-
40 ness.

Fig. 2 is a fragmentary view of the control lever for disabling the printing mechanism.

45 Fig. 3 is a detail side view of the driving mechanism for the impression hammer, and the record material severing means.

Fig. 4 is a view in front elevation, showing in detail the scissor-like record material severing means.

50 Figs. 5 and 6 are detail views of the scissors-motion controlling means, Fig. 6 being a perspective view.

Fig. 7 illustrates one form of a stub receipt printed and issued by the machine.

55 Fig. 8 is a view in rear elevation, partly in section, of the "on and off" knob, and a part of

the mechanism adjusted thereby, to control the issuance of a receipt.

Fig. 9 is a detail view in front elevation of the record material severing device, showing the scissors in their partially retracted position.

Fig. 10 is a similar view of the same mechanism with the scissors in their fully retracted position.

Fig. 11 is a view in rear elevation, partly in section, of the automatic Geneva coupling for connecting the printer drive shaft to the Geneva drive for feeding the record material.

Fig. 12 is a detail side view of the receipt electro and impression rolls and the mechanism which rotates them to feed the record material.

Fig. 13 is a detail perspective view of the Geneva drive disk.

Fig. 14 is a disjoined perspective view of the Geneva drive for the record material feeding means.

Fig. 15 is a side elevation of the differential mechanism for a bank of transaction keys.

Fig. 16 is an end view of parts shown in the lower left corner of Fig. 15.

General description

The printing mechanism disclosed herein in its preferred form, is especially adapted for use in connection with a machine of the type to which are directed the above-mentioned applications for Letters Patent, but it will be understood that, by a few minor changes, applicant's printing device may be used on a number of other types of cash registers or accounting machines, without departing from the spirit and scope of the invention.

A single printing hammer is provided to make two successive impressions or imprints at each operation of the machine, from type elements, on an issuing record material, or, an issuing receipt, as it will be hereinafter referred to.

Two groups of electro and impression rolls are provided to print predetermined data on the receipts, and to feed the record material from which the receipts are severed, the electro and impression rolls being removably assembled in the machine. A perforating device is mounted on one of the electro rolls to perforate the record material web between the two impressions made thereon. By causing two duplicate imprints to be made on the record material with a space between them, and by perforating the record material web between said impressions, a stub receipt is issued, the stub of which is readily detachable from the body thereof.

Novel means is provided to sever the printed checks from the web of record material, and a receptacle is provided to retain the severed receipts in a position accessible to the operator.

5 A number of type carriers, only one 30 (Fig. 1) of which is shown, are suitably journaled in the printing section of the machine, and are adapted to be differentially positioned in the usual and well-known manner, under the control of keys
10 in the main register (not shown), to which the printing mechanism is attached.

While in this illustrative form, the printing mechanism is adapted to print on an issuing record material or receipt, it is evident that, by
15 slight changes, it may be adapted to print on insertable slips, etc., and on a detail record strip retained in the machine.

The printing mechanism may be thrown on or off, that is to say, rendered effective or ineffective to perform its functions, from three
20 separate sources, namely, manually by adjustment of an "on and off" knob, manually by adjustment of a control lever adapted to condition the cash register with which the invention
25 is adapted to be used, to make various kinds of operations, and automatically under the control of a plurality of depressible keys, not shown. When the printing device is thus disabled, the record material feed mechanism
30 is disconnected from the printer drive shaft and other mechanism is controlled to interrupt the operation of the printing hammer and the receipt shearing device.

35 *Explanation of the invention in detail*

The entire printing mechanism is supported in a printer frame 31 (Fig. 1) which, in turn, is suitably secured to one of the main machine frames, not shown.

40 An ink ribbon 32 (Fig. 1) is alternately wound and unwound from a pair of spools 33 and 34 suitably journaled in a bracket (not shown) removably mounted in the printer frame 31. Any conventional mechanism may be provided to
45 feed the ribbon, a suitable ribbon reversing device being provided to wind the ribbon on the spools alternately. The ribbon feeding and reversing mechanisms are not shown herein, as these devices have no particular bearing on the present invention. The ribbon 32 passes around
50 the type elements 30, being guided by guard shells 35 and 36 surrounding the type elements. The adjacent edges of the guards 35 and 36 are spaced apart to form apertures through
55 which impression hammers are driven to take impressions from the types at diametrically opposite points of the type carriers, on the issuing record material and on a strip of detail record material, not shown, which latter is retained
60 in the machine. On one side, the ribbon passes between a check or receipt chute 37 suitably supported on the guards 35 and 36 and the type elements, the opposite walls of the chute 37 being apertured, as at 38, through which one of
65 the impression hammers 39 pivoted on a stud 40, is driven to take the impression on the issuing record material. The ribbon mechanism, including the spools 33 and 34 and the guards 35 and 36, is mounted on a bracket, not shown,
70 removably insertable in the printer mechanism to facilitate the replacement of worn ribbons with unused ones.

75 The mechanism for operating the hammers 39 to make successive impressions at each operation of the machine on the issuing receipt strip or

record material, is not shown herein, but a full and complete disclosure thereof may be had by reference to applicant's co-pending application, Serial No. 294,492, filed July 21, 1928, now Patent No. 1,761,556, issued June 3, 1930.

Receipt feeding mechanism

The receipt web 45 (Fig. 1) is unwound from a supply roll 46 journaled on a stud 47 projecting outwardly from the printer frame 31. The web
85 45 passes around a guide stud at 44, which supports one end of a chute 48, said stud projecting from the frame 31.

Impression and feed rolls 52 and 57 (Fig. 12) are mounted in a unit removable endwise from the machine, such unit including end frames, one of which 54 (Fig. 1) is at the outer end of the unit, the co-acting end frame being spaced apart therefrom and lying adjacent the printer side frame 31. Cross rods 49 connect the respective
90 end frames 54. The impression and feed rolls are journaled on hollow shafts 53, 58, respectively, having eccentric trunnions journaled in the respective end frames 54, and normally lie adjacent to and co-act with electro rolls 50 and 55, respectively, journaled on studs 51 and 56,
95 respectively, projecting from the printer side frame 31. Spring-pressed yokes 67 and 68 journaled on the respective cross-rods 49 of the removable roll frame, carry ink rollers 65 and 66
100 and press them against their respective electro-rolls 50 and 55. The ink rollers are journaled on shafts 60 journaled in the yokes, the front ends of which shafts are extended to project through slots in the front end frame 54.

This mechanism is more fully explained in Letters Patent to Shipley, No. 1,614,540, issued January 18, 1927.

The web 45 is led through the chute 48, and between the couple formed by the electro roll 50
115 (Fig. 12) and its impression roll 52. The web 45 then passes between the second electro roll 55 and its co-acting impression roll 57. Means, hereinafter described, is provided to rotate the rolls just described, to feed the receipt web. The impression rolls 52 and 57 are eccentrically mounted so
120 that by a slight rotation of the shafts 53 and 58, they may be cast off from the electro rollers 50 and 55, respectively, to permit their withdrawal endwise from the machine, and to permit the receipt web to be readily inserted between the
125 respective couples, when charging the device with a fresh roll of receipt paper.

The web 45 is now fed into a curved chute 59 supported between the end frame 54 and its companion end frame (not shown), and then through the chute 37. After leaving the chute 37, the web 45 is fed through the shearing device where,
130 near the end of the operation, the printed and perforated receipt is severed from the web 45. The severing means and the operating and controlling mechanism therefor, will be described later.

In withdrawing the impression feed roll unit from the machine, the impression rolls 52, 57 and ink rollers 65, 66 are first cast off their respective
140 electro rolls 50 and 55, as follows:

Mutilated gears 69 and 70 (Fig. 1) secured to the outer ends of the eccentric shafts 53 and 58, respectively, mesh with teeth formed on the hub
145 of a cam lever 71 pivoted at 72 on the end frame 54. The cam lever 71 is normally latched in such position that the impression rolls 52, 57 and the ink rollers 65, 66 bear against the peripheries of their respective electro-rolls 50, 55. Rocking the

cam lever 71 clockwise (Fig. 1), turns the mutilated gears 69 and 70 counter-clockwise to cast off the eccentrically mounted rolls 52 and 57 from their electro rolls. The lever 71 also brings cams 5 74, with which it is equipped, against the forward ends of the shafts 60 of the ink rollers 65 and 66 to rock said rollers away from the electro rollers. The walls of concentric slots 61 formed in the cam lever 71 fit in annular grooves in the studs 51 and 10 56 to retain the impression and ink rollers in the proper positions. These slots, when the cam lever is rocked clockwise, escape their studs and the impression and feed roll frame is free to be removed endwise from the machine.

15 The above-described electro rolls, impression roll and ink roller mechanism, is old and well known in the art, and is fully illustrated and described in Letters Patent of the United States, Nos. 1,619,796 and 1,614,540, granted March 1, 20 1927 and January 13, 1927, respectively, to B. M. Shipley.

Check feed driving mechanism

Mechanism is provided to turn the electro roll 25 50 (Fig. 12) in counter-clockwise direction, and the electro roll 55 in clockwise direction, at each operation of the machine, to feed the receipt web and to print thereon from the electro rolls 50 and 55. The feed of the web is intermittent, that is, the web is advanced between the two successive imprints effected by the impression hammer 30 39 (Fig. 1) the feed rolls being rotated to feed the receipt into position to receive the second imprint, after which a second longer step of feed is imparted to the web to advance it into position where the printed receipt is severed from the web. This intermittent drive is conveniently effected by a Geneva movement now to be described.

40 The check feed drive mechanism is best shown in Figures 11 to 14, inclusive. The forward end of a printer drive shaft 82 journaled in the printer frame 31 and in the main register frame, carries a sleeve 81 loosely mounted thereon and 45 having a drive disk 80 fast thereto. The printer drive shaft 82 is given one complete rotation at each operation of the machine by suitable means, not herein shown, but fully disclosed in Figure 40 of the U. S. application for Letters Patent, Serial No. 608,281, filed December 21, 1922, in the name of Bernis M. Shipley, now Patent No. 1,817,383, issued August 4, 1931.

Also the sleeve 81, carrying the locking disk 107, drive disk 80 with locking disk 88, and the 55 cylinder cam 106, turns with the shaft 82 due to the clutch connection 101, and also slides axially thereof.

Studs 83, 84 and 85 laterally projecting from one side face of the drive disk 80, successively enter radial slots formed in a Geneva wheel 86 60 fast on a hub 90 journaled on a stud 87 projecting from the printer frame 31, and serve as rundles to turn such wheel. A locking disk 83 mounted on the sleeve 81 and fast to the disk 80, normally prevents rotation of the Geneva wheel until the proper time during the rotation of the drive disk 80.

The periphery of the locking disk 88 is cut away or recessed at points opposite the studs 83, 84 70 and 85, to afford clearance for the cogs of the Geneva wheel 86, the outer concave ends of the successive cogs fitting the unmutated periphery of the locking disk, which maintains the receipt feeding mechanism locked during the time the unmutated periphery of the locking disk co-acts

with the cogs of the Geneva wheel. The studs 83, 84 and 85 each turn the Geneva wheel one-fifth of one rotation in clockwise direction or a total of three-fifths of one rotation at each rotation of the drive shaft 82, a space being left between the stud 83 and stud 84 greater in extent 80 than the space between the studs 84 and 85. The stud 83 imparts a single step of movement to the Geneva wheel, after which there is a brief dwell to enable other mechanisms to function while the paper web is stationary, after which the drive disk, as it rotates, brings the studs 84, 85 into engagement with the wheel. The studs 84 and 85 are so spaced relatively to each other, that the combined movement imparted to the 85 Geneva wheel thereby is continuous and, of course, equal to twice the movement imparted to the wheel by the stud 83.

These movements of the wheel 86 are transmitted to the electro-rolls 50 and 55 by a train 95 of gears, one gear 89 (Figs. 1, 11, 12 and 14) of which train is fast on one end of the hub 90 which carries the Geneva wheel 86. The gear 89 meshes with an intermediate or idler pinion 91 (Fig. 12) journaled on a stud 92 projecting 100 from the printer frame 31. This pinion, in turn, meshes with a gear 93 journaled on the stud 56 and the gear 93 meshes with a gear 94 on the stud 51. The gears 93 and 94 are clutched to the electro-rolls 55 and 50, respectively, by mechanism (not shown herein). The ratio of the Geneva movement and the train of gears is such that three-fifths of one rotation imparted to the Geneva wheel 86 by the studs 83, 84 and 85, is 110 sufficient to drive the electro-rolls 55 and 50, respectively, one complete clockwise and one complete counter-clockwise rotation at each operation of the printing mechanism to feed the paper web 45 between the first and second impressions, and again after the second impression has been made, to bring the printed receipt into position to be severed from the web.

A perforator knife 95 (Fig. 12) is fixed in the electro-roll 50 in such a manner that, as it passes the point of contact of electro-roll 50 and its pressure roll 52, the perforator is forced through the paper web 45, to perforate the latter, as indicated at 96 (Fig. 7).

The driving disk 80 is so connected with the printer drive shaft 82 that the disk may rotate with the shaft, and be slidable axially thereof. To this end, a collar 101 (Fig. 14) fast on the printer shaft 82, carries opposed lugs 102 and 103 thereon, fitting within longitudinal slots 104 and 105 (Fig. 13), respectively, in a mutilated 130 cylinder cam 106 mounted on the sleeve 81 fast to the grouped disks 80, 88 and a third disk 107. The slots 104 and 105 divide the cylinder cam 106 substantially into two halves. The printer shaft 82 and its collar 101 are driven by any 135 suitable means through one complete rotation in counter-clockwise direction at each operation of the machine, to rotate the cylinder 106 and the Geneva drive disk 80, thereby operating the receipt feeding mechanism, as described above, and actuating other mechanism hereinafter described. 140

Receipt feed control

At certain operations of the machine, it is not desired to issue a printed receipt, to prevent 145 which, the receipt feeding mechanism is disabled. This is accomplished by sliding the Geneva drive disk 80 to the left on the printer drive shaft 82, as viewed in Figs. 11 and 14, to withdraw the feed studs 83, 84 and 85 from the Geneva 150

wheel 86, so that as the drive disk 80 rotates, the studs are ineffective to advance the Geneva wheel.

The drive disk 80 on such withdrawal, carries with it the locking disk 88 which would leave the Geneva wheel 86 unguarded, were it not for the provision of the third disk 107, which is of exactly the same diameter as the locking disk 88 and is likewise mounted on the sleeve 81 so that as the sleeve shifts to the left (Fig. 14) the unmutilated guard disk 107 takes the place of the locking disk 88 to lock the receipt feed mechanism against any operation. The disks 80, 88 and 107 and the mutilated cylinder cam 106 are all mounted on the sleeve 81 to rotate with the printer drive shaft 82, and slide as a unit axially of the shaft. This group of parts collectively, will hereinafter be referred to as the Geneva drive unit.

A spring 108 (Figs. 11 and 14) coiled about the printer drive shaft 82 and compressed between a collar 109 fast thereon and the guard disk 107 fast on the sleeve 81, constantly urges the Geneva drive unit towards the left to disable the receipt feed mechanism, but normally is prevented from shifting said unit by a node 110 on the rim of one of the halves of the cylinder cam 106, bearing against the face of a beveled block 111 on a circular bracket 112 fast on the side of the printer frame 31. As the printer shaft 82 and its sleeve 81 and cylinder cam 106 rotate during the course of the operation of the machine, a second node 113 on the cylinder cam 106, similar to the node 110, is brought to bear against the face of the block 111, and as the printer shaft 82 and sleeve 81 continue to rotate, this node 113 eventually, and at the proper time, escapes the block 111, whereupon the spring 108 is free to slide the Geneva drive unit toward the left to disable the receipt feeding means.

Whether or not these parts may be so slid, at this time, depends further upon a control annulus 114 telescoped over the mutilated cylinder cam 106 and having at one end an inwardly extending circular flange 120 occupying an annular groove 121 (Fig. 14) formed by the periphery of the flange 79 of the sleeve 81 and the base of the cylinder cam 106 which is larger in diameter than the flange 79 and is secured thereto by through bolts 97 passing through the drive disk 80 and locking disks 88 and 107, (see Fig. 14). The annulus 114, therefore, slides longitudinally with the Geneva drive unit and is free to rock in either direction about the cylinder cam 106. The control annulus 114 carries a pair of diametrically opposed tenons 122 and 123 on its edge facing the bracket 112. These tenons are adapted to be either in or out of line with notches 124 and 125, respectively, formed in the bracket 112, so that when the control annulus slides towards the left, under the influence of the spring 108 when the node 113 has escaped the block 111, the lugs may enter the notches, thereby permitting the spring 108 to continue to slide the Geneva drive unit to the left to disable the receipt feed, or assuming that the tenons 122 are slightly out of register with the notches 124, 125, then, when the node 113 escapes the block 111, the tenons 122 and 123 bear against the unrecessed face of the bracket 112 to hold the Geneva drive unit in its effective position against the action of the spring 108. In other words, the entrance of the tenons 122 and 123 into the notches 124 and 125, or the non-entrance of the tenons into the notches, determines whether

the receipt feed driving mechanism shall operate or not.

A plurality of means is provided to determine the position of the control annulus 114 (Figs. 11 and 14), thereby determining whether or not a receipt shall issue. These means include a manually adjustable "on and off" knob, a manually set lever to condition the register or accounting machine to perform various operations, and means set differentially under the control of a plurality of manipulative keys. The mechanism for setting the control annulus 114 under the control of the "on and off" knob, will be described first.

Receipt feed controlled by the "on and off" knob

A flat ring 126 (Figs. 11, 12 and 14) is mounted on a recessed shoulder formed on the control annulus 114 and clutched thereto by teeth 135 (Fig. 14). The ring 126 and the end of the annulus 114 constitute an abutment against which the face of the disk 80 bears, when the control annulus 114 rests against the bracket 112, the abutment sustaining the thrust of the spring 108, at this time. When the nodes 110, 113 on the cylinder cam 106 bear against the block 111, the cylinder cam takes the thrust of the spring 108 directly and the control annulus 114 is free to be adjusted at this time. As soon as the node 113, in rotating with the shaft 82, escapes the block 111, however, the spring 108 slides the sleeve 81 with its Geneva drive unit to the left (Fig. 14), whereupon the tenons 122 and 123 either strike the face of the bracket 112 or enter their respective notches 124 and 125.

When the machine is at rest, the cylinder cam 106 is in such position that its node 110 bears against the stationary block 111 on the bracket 112 and sustains the thrust of the spring 108, thereby relieving the control annulus 114 and its ring 126 of the pressure of such spring, to free the annulus for adjustment, and as one means to manually position the control annulus with its tenons 122, 123, at this time, there is provided a tubular sleeve 143 (Fig. 8) telescoped over a long stud 144 projecting from the printer side frame 31.

The outer end of this sleeve is knurled as at 145, to afford a convenient grip for turning the sleeve, the inner end of which sleeve carries a cam disk 142 (see Fig. 1), the periphery of which has a notch 139 of graduated depth formed therein with seats at its higher and lower ends.

One arm of a bell-crank 133 fast on a shaft 134 journaled in the printer frame 31, carries a stud 146 yieldingly held in contact with the periphery of the cam by a spring 140. A link 129 connects the remaining arm of the bell-crank 133 with the outer end of a long stud 130 (see also Figs. 11 and 14) projecting from a lever 131 journaled on the stud 87.

The link 129 is slotted, as at 128 (Fig. 12) to embrace a pin 127 projecting from a lobe formed on the flat ring 126 secured to the control annulus 114.

The spring 140 constantly urges the bell-crank 133 in clockwise direction to draw the link 129 towards the right, as viewed in Figs. 1 and 12, the link 129, in turn, operating through the pin 127 to rock the ring 126 and with it the control annulus 114 counter-clockwise to position the tenons 122 and 123 into line with the notches 124 and 125, whereupon, as will be remembered, the receipt feeding mechanism is disabled during the next operation of the machine.

The position of the control annulus 114 (Fig. 150

14), however, may be governed by the position of the disk 142 (Fig. 1) through its graduated recess 139, the bell-crank 133 and connected parts.

The tubular sleeve 143 is internally shouldered 5 (Fig. 8) to form a seat for a plunger 151 held against the shoulder by a spring 150 confined between the plunger and an abutment 152 on the stud 144. The pressure of the plunger 151 against its seat normally holds the tubular sleeve 143 and its control disk 142 in their innermost positions, and to insure the retention of the manually operable sleeve 143 and disk 142 in either of its 10 adjusted positions, the disk is equipped with holes 148 spaced apart from each other a distance equal to that through which the sleeve 143 is turned, to set the control annulus 114. A pin 149 projects from the printer side frame 31 over which pin either hole 148 is fitted, by the spring 150, 15 when the sleeve is in either of its adjusted positions, to lock the sleeve 143 and control disk 142 in either of their set positions.

Obviously, in setting the sleeve 143 and control disk 142, it is necessary for the operator to first pull outwardly on the knurled sleeve 142 to 25 disengage the disk 143 from the locking pin 149, and then turn the sleeve until further rotation is resisted by the contact of the roll 146 on the bell-crank 133 with one or the other end wall of the graduated recess 139 in the control disk 30 142, which indicates to the operator that the desired adjustment has been made, whereupon the operator releases the sleeve to the action of the spring 150, which draws the sleeve and control disk 142 inwardly to fit the appropriate hole 35 148 of the disk over the locking pin 149.

If desired, a spring 147 (Fig. 1) connected to the control disk 142, may be provided to restore the control disk and its sleeve 143 to one of their 40 adjusted positions, as soon as the control disk is disengaged from the locking pin, when the control disk has been set to the opposite adjustment prior to the preceding operation.

When the control disk 142 occupies the position in which it appears in Fig. 1, it maintains 45 the bell-crank 133 in its extreme counter-clockwise position, thereby holding the link 129 in its left-hand position and the control annulus 114 with the tenons 122 and 123 out of register with their notches 124 and 125, so that when the node 50 113 on the cylinder cam 106 escapes the block 111 and the spring 108 acts to slide the Geneva drive unit and sleeve 81 towards the left, the tenons 121 and 122 will strike the face of the bracket 112, to retain the Geneva drive in its effective position 55 and feed a receipt.

However, if the control disk 142 is turned clockwise from the position shown in Fig. 1, the stud 146 influenced by spring 140, will settle into the deeper seat in the recess 139, during the operation of the machine, and enable the spring 60 140 to rock the bell-crank 133 clockwise and draw the link 129 towards the right. The link, in turn, will rock the control annulus 114 counter-clockwise until the tenons 122 and 123 register with their notches 124, 125 so that, at the proper time, 65 said tenons will enter their notches and enable the spring 108 to slide the Geneva drive unit towards the left, thereby disabling the receipt feeding mechanism.

When the "on and off" knob or sleeve 143 is in its "on" position, as shown in Fig. 1, a receipt will be printed and issued at each operation of the machine, regardless of the adjustment of 70 other receipt feed controlling means. But, if the knob 143 is turned to its "off" position with the

stud 146 in the deeper seat of the control disk 142, no receipt will be issued, unless it is determined by the other receipt feed controlling means that a receipt is to be issued, in which 80 case the bell-crank 133 is rocked counter-clockwise independently of the control disk 142 to rock the control annulus 114 to shift the tenons 122, 123 out of line with their notches 124, 125, to retain the Geneva drive disk 80 in its effective position. 85

Check feed controlled by key

As one such receipt feed controlling means, operable when the "on and off" knob or sleeve 143 is in its "off" position, to effect the issuance 90 of a receipt notwithstanding the apparent negative control of the "on and off" knob, the following mechanism is provided.

The keyboards of the machine to which this invention is applied, are equipped with rows of amount keys (not shown) and a row of special keys, which may be transaction keys to variously 95 condition the machine, select special totalizers, etc.

Such a row of special keys is shown at 251 100 (Fig. 15), depression of any of which inserts its inner end in the path of one arm of an elbow lever 252 pivotally mounted at 253 on the outer end of a rocking arm 254 journaled on a hollow stud 255 supported in hangers 256 (one only being 105 shown), mounted on cross rods 257 extending between the main side frames of the machine.

The remaining arm of the elbow lever 252, assisted by a link 253 likewise pivoted to the rocking arm 254, supports an angular latch 259, the inner end of which normally lies in front of a 110 shoulder 260 formed on an arcuate actuator 261 journaled on the stud 255 and connected by a link 262 to a cam lever 263 pivoted at 264 to one of the hangers 256. 115

Driving cams 265 fast on the drive shaft 266, cooperate with projections 267 spaced apart on the forked end of the cam lever 263 to rock the latter first clockwise, then counter-clockwise. 120

The cam lever communicates such motion through the link 262 to the actuator 261 to rock the latter similarly.

The actuator carries with it the arm 254 due to the latch connection 259, until the free end of the elbow lever 252 strikes and is arrested by the projected inner end of a depressed key 251, 125 whereupon the latch 259 is withdrawn from engagement with the driving member 261 which completes its clockwise travel. 130

Disengagement of the latch 259 from the actuator 261 engages the forward end of the latch with the proper one of a series of notches 268 135 formed in an arcuate bar 269, mounted on the cross rod 257 and arranged concentrically with the path of travel of the arm 254, to retain the arm 254 in that position at which the elbow lever 252 encountered the inner end of the depressed key 251, the unutilized edge of the actuator 261, as it completes its travel, maintaining the outer end of the latch 259 in locking position, against the tension of the usual 140 restoring spring 244.

The arm 254 is thus differentially positioned according to the particular key depressed. 145

The actuator 261, on its return, picks up the differentially positioned arm 254 and returns it to home position in the manner well known in this type of machine.

The differentially positioned arm 254 aided 150

when necessary by a projection 270 on the cam lever 263, transmits movement to indicating and printing mechanisms (not shown) through a minimum movement beam 271 pivoted at its forward end at 272 to the differential arm 254 and bifurcated at its rear end to embrace a pin 273 located intermediate the ends of a link 274, the beam extending beneath the stud 255 on which it fulcrums.

The upper end of the link 274 is pivoted to a segment 275 forming a part of the indicator mechanism, and the lower end of the link is pivoted to an arm 276 fast on a sleeve 277 journaled on the cross shaft 155 (see also Fig. 1) suitably mounted in bearings in the main side frames of the machine.

A segment 278 connected with the arm 276 engages with a train of mechanism (not shown) leading to a type carrier forming part of the printing mechanism (also not shown).

The key-controlled differential mechanism just described, is old and forms a part of this invention only insofar as it coacts therewith to produce the novel results.

Obviously, the differential arm 254 through the foregoing connections, differentially rotates the sleeve 277 and segment 278 to variously position the corresponding type carrier (not shown), and this variously adjustable movement imparted to the segment 278 is utilized to variously position a control sector 154 (Figs. 1 and 15) journaled on the shaft 155 with which coacts a feeler finger or beak 153 fast on the short shaft 134 and turning with the bell-crank 133.

The control sector 154 has a stepped periphery, as indicated at 160, the hub of the sector having a cross-over tail 156 extending through an aperture formed in the segment 278, so as to partake of the differential adjustment imparted to the segment under control of the keys 251.

It is obvious that with the roll 146 of the bell-crank 133 seated in the deeper end of the recess 139, the provision of means other than the control disk 142 which will rock the bell-crank 133 counter-clockwise (Fig. 1) against the tension of its spring 140, will shift the link 129 to the left and turn the control annulus 114 clockwise (Fig. 14) to position its tenons 122, 123 out of line with their notches, and thus prevent the displacement of the Geneva unit.

The periphery of the sector 154 is provided with a step 160 intermediate the low portions 161, it being evident that such periphery may have any desired configuration, any point of which may be positioned under the end of the feeler finger 153. This stepped periphery 160-161 of the sector 154 represents ten positions controlled by a row of nine keys 251 and a zero or home position, and during an operation of the machine, the sector 154 is differentially positioned corresponding to the particular key 251 depressed, the sector remaining in its last-adjusted position until re-positioned under control of another key 251.

The height of the step 160 above the steps 161 (Fig. 1) of the control sector 154, is substantially equal to the difference in height between the high and low seats of the recess 139, of the control disk 142, and it is obvious that, with the manually adjustable knob 143 in its "off" position, at which time the roll 146 on the bell-crank 133 is aligned with the deeper seat of the recess 139; and with the control sector 154 adjusted to locate one of the low steps 161 in the path of the feeler finger 153, the spring 140 would tend to rock

the bell-crank to its farthest clockwise position to seat the roll 146 in the deeper seat and to cause the free end of the feeler finger 153 to contact the low step 161.

Thereafter, while the adjustment of the control disk 142 remains the same, it might well occur that a key 251 will be depressed to select the high step 160 of the control sector 154 for cooperation with the feeler finger 153, whereupon any attempt to rock the control sector will cause the rise of the step 160 to contact the end of the finger and result in breakage, strain or other damage to the machine, to avoid which, a stud 162 is provided on the locking disk 107 which stud contacts a concave edge 164 substantially concentric with the drive shaft 82, when the machine is at rest to restrain the lever 131 and bell-crank 133 against yielding to the tension of the spring 140 until after sufficient time has been afforded the key-controlled differential mechanism of Fig. 15, to properly position the control sector 154.

In operation, therefore, the stud 162, assisted by a supplementary stud 163 also on the locking disk 107, traverses the concentric edge 164 of the lever 131 to hold the latter and consequently the control annulus 114 in home position throughout about 145 degrees of a complete rotation, during which time, the bell-crank 133 with its roll 146 and the feeler finger 153 are held suspended against the tension of the spring 140, to afford time within which to position the control sector 154.

The length of the concave edge 164 (Fig. 1) of the lever 131 bears such relation to the length of the nodes 110, 113 (Fig. 14) of the cylinder cam 106 in their contact with the block 111 on the bracket 112, that the bell-crank 133 with the feeler finger 153, are released for operation just prior to the escape of the node 113 from the block 111, the locking disk 88 having a sufficient unmutilated periphery to hold the Geneva wheel 86 against operation during the time occupied by the studs 162, 163 in passing the concave edge of the lever 131, and the time occupied by the nodes 110, 113 in passing the block 111.

It may be readily understood that a single shoe of a length to correspond with the positions of the studs 162 and 163, might be used in place of the studs if desired.

If, on the previous operation of the machine, assuming the control disk 142 to be positioned with its deeper seat in line with the roll 146 of the bell-crank 133, the feeler finger 153 found a low spot 161 on the control sector 154, the spring 140 holds the tip of the finger in contact therewith at the end of the operation. It is, therefore, necessary to rock the feeler finger counter-clockwise to raise the finger at the beginning of the next following operation in order to enable adjustment of the control sector 154 to position its high step 160 beneath the feeler finger, should a corresponding key 251 be operated.

As the Geneva drive unit (Figs. 12 and 14) completes its rotation, the leading stud 162, projecting from the face of the auxiliary locking disk 107, engages the upper end of the concave edge 164 of the lever 131 and rocks the lever counter-clockwise slightly past the position in which it is shown in Figs. 1 and 12. This draws the link 129 towards the left to rock the bell-crank 133, shaft 134 and feeler finger 153 counter-clockwise to clear the high step 160 of the

control sector 154, so that, on the next operation of the machine, the latter may be adjusted to its new position.

Check feed controlled by total lever

Machines of the type to which this invention is applied, are provided with adjustable total levers manipulated by the operators to condition the mechanisms to print totals and clear the totalizers, or to print sub-totals, and with certain classes of work, it is desired to print and issue a receipt only at such times.

In such event, the "on and off" knob or sleeve 143 is set at its "off" position, which is its farthest clockwise position, and to enable the operator to obtain a receipt without having to remember to reset the sleeve knob just previous to a totaling or sub-totaling operation, means is provided to render the receipt feeding mechanism effective when the sleeve is set at its "off" position.

To this end, the usual total control lever 168 (Fig. 2) integral with the cam-slotted plate 169, a fragment of which appears in Fig. 2, is journaled on a stud 170 suitably supported in the machine for manual operation. The lever 168—169 is the well known "total control lever" disclosed in the above mentioned Shipley patent, and also fully disclosed in the Fuller patent, No. 1,242,170, issued October 9, 1917, and in the patent to Shipley, No. 1,619,796, issued March 1, 1927. When the lever 168—169 is rocked in either direction from its intermediate adding position (Fig. 2) to any of its several positions to adjust the machine to take totals or sub-totals, the cam slot 171 in the plate 169 wipes against a stud 172 entered therein and carried by an arm 173 of a multiple-armed lever 174 pivoted at 180 to rock the lever 174 counter-clockwise. A stud 181 on an arm 182 fast on a through shaft 167 (see also Fig. 1) journaled in the side frames of the machine, projects through a slot 183 formed by another arm 184 of the lever 174 and an arm 185 pivoted at 180 and connected to the arm 184 by a spring 186. The lever 174 on its counter-clockwise travel, rocks the arm 182 and shaft 167 clockwise, as viewed in Fig. 2, or counter-clockwise, as viewed in Fig. 1. At a point adjacent the feeler finger 153, the through shaft 167 carries an arm 166 having a projection 165 adapted to contact an arm 187 extending upwardly from the feeler finger 153. If, on the last operation of the machine, the feeler finger 153 rests on a low step 161 of the control sector 154, the arm 187, carried thereby, has been rocked into the path of the projection 165.

Hence, when the total control lever 168 is adjusted prior to total or sub-total operations, and rocks the through shaft 167 and arm 166 counter-clockwise, the projection 165 on the arm 166 strikes the arm 187 and rocks said arm and the feeler finger 153, shaft 134 and bell-crank 133 counter-clockwise to shift the link 129 towards the left. The link 129 rocks the control annulus 114 clockwise so that the tenons 122, 123 are out of alignment with the notches 124—125, so that when the nodes 113, 114 escape the block 111 to free the Geneva unit to the action of its spring 108, the tenons 122, 123 will contact the face of the bracket 112 and hold the feed disk 80 in its effective position. The total control lever 168, when restored to its normal or "adding" position, rocks the through shaft 167 clockwise, as viewed in Fig. 1, thereby releasing the feeler finger 153, shaft 134 and bell-crank 133 to the action of the spring 140, which immediately rocks these parts

clockwise until the finger 153 rests on a high step 160 of the control sector 154, or the roll 146 seats in the shallower end of the recess 139.

Near the end of each operation of the machine, regardless of whether a receipt has been issued or not, a beveled edge 183 of the node 110 on the cylinder cam 106 rides up on the beveled end of the block 111 on the bracket 112 and cams itself and the Geneva drive unit towards the right, compressing the spring 108, and positioning the feed studs 83, 84, 85 and the locking disk 88 in line with the Geneva wheel 86.

Receipt web severing

As heretofore explained, the leading end of the paper web lies between the printing hammer 39 (Fig. 1) and the type carriers 30.

Assuming the controls set to effect the issuance of a receipt, means (not shown herein but fully disclosed in the application of Charles H. Arnold, filed July 21, 1928, Serial No. 294,492 which resulted in Patent No. 1,761,556) operates after the type carriers 30 are differentially positioned, to print the desired amount thereon, after which the single feed stud 83 (Fig. 12) on the feed disk 80 operates the Geneva wheel 86, and train of gears 89, 91, 93 and 94, to advance the leading end of the paper web to present a second printing area thereon to the type carriers 30. The printing hammer 39 is again operated to print the same amount on the newly presented surface of the paper web, after which the two feed studs 84, 85 operate the Geneva wheel to impart a double feed to the leading edge of the paper web and cause it to protrude from the usual discharge opening provided in machines of this type.

It now becomes desirable to sever the printed portion of the paper web from its supply 45 to enable the operator to remove the printed receipt thus formed from the machine.

The leading end of the web has been perforated intermediate the two imprints thereon and fed out of the chute 37, adjacent which the severing means is located.

In the present instance, the severing means includes a stationary blade across which a floating blade or scissor is adapted to be passed by the action of a strong spring to shear the check from the web. Normally the blades lie in closed position, but early in the operation of the machine, the floating blade is retracted, stretching its operating spring, and is latched in its retracted position. The floating blade is released very near the end of the operation of the machine by a trigger arrangement, and its spring immediately operates the floating blade to sever the receipt from the supply.

The stationary blade 190 (Figs. 1, 4, 9 and 10) is secured at its outer end to a fixture 191 supported on the outer end of the pivot stud 40 for the hammer, the inner end of the stationary blade 190 being secured directly to the hammer stud 40 near its base. The floating blade 192 is pivoted on a stud 193 carried by one arm of a bell-crank 194 journaled on a stud 196 projecting from the stationary blade 190. An inherently resilient finger 197 (Figs. 1 and 4) projects laterally from a point near the outer end of a bracket 198 secured to the side frame 31, and presses the outer end of the floating blade 192 against the stationary blade 190. A spring 199 (Fig. 1) coiled about the stud 196 and compressed between a retaining washer 200 and a bearing washer 201 presses the inner end of the floating blade 192 against the stationary blade 190. A pin passing through the

stud 196 near its outer end, holds the washer 200 in place.

A pair of cam plates 205 (Fig. 3) fast on the printer drive shaft 82, rock the bell-crank 194 counterclockwise from its closed position, shown in Fig. 4, to its open position, shown in Fig. 10, where it is latched until near the end of the operation of the machine. The cams 205 cooperate with rollers 207 and 208, respectively, on a cam arm 209 fast on a shaft 210 journaled in the printer frame 31 and in one of the machine side frames. A link 211 connects an arm 212 fast on the shaft 210 to one arm of bell-crank 213 fast on a shaft 214 journaled in the printer frame 31 and in a printer bracket 215 supported on the outer end of the pivot stud 40. The remaining arm of the bell-crank is pivotally connected to a slide 216 shiftably supported on a stud 217 projecting from the printer frame 31. The printer drive shaft 82 and the cams 205 make one complete rotation in clockwise direction at each operation of the machine, to rock the cam arm 209, shaft 210 and arm 212 first clockwise and then counter-clockwise to normal. The link 211 transmits this movement to the bell-crank 213 and shaft 214 to rock these parts likewise first clockwise to lower the slide 216, and then counter-clockwise to restore the slide to its normal position. The slide 216 carries beveled ear 218 projecting at right angles to the slide, which ear, as the slide shifts downwardly, wipes past a roller 219 on the remaining arm 225 of the bell-crank 194 to rock the bell-crank counter-clockwise to one limit of its travel, as shown in Figure 10, and with it the floating blade 192, to retract the latter and tension a drive spring 233 connected to a projection 221 of the bell crank 194.

The end of the arm 225 lies in the path of a nose 224 projecting laterally from a latch 226 pivoted at 223 to the stationary blade 190, and spring-pressed, as indicated at 222, to bear upon the free end of the arm 225 at all times.

A trip finger 232 on the latch 226 takes over the toe 228 of a trip arm 229 pivoted to one leg 230 of a bail 250 journaled on a stud 231 projecting from the printer side frame 31.

The trip arm 229 is apertured to fit over the shaft 214 which limits its travel in either direction, and its toe 228 lies behind and in contact with the ear 218 on the slide 216.

As will be hereinafter noted, the trip arm 229 constitutes a coupling member between the retracting means and the latch.

As the bell-crank 194 arrives in its retracted position, the spring-pressed latch 226 drops over the shouldered end of the arm 225 to hold the bell-crank 194 in its retracted position until near the end of the return movement of the slide 216, during which latter movement the beveled ear 218 contacts the toe 228 on the free end of the trip arm 229 to restore the trip arm 229 and disengage the latch 226 from the actuating bell-crank 194 to free the bell-crank to the action of its strong drive spring 233, whereupon the spring 233 rocks bell-crank 194 sharply clockwise, carrying the floating blade 192 upwardly past the stationary blade 190 (Fig. 4) to sever the receipt, which, by this time, has been fed between the blades 190, 192.

The floating blade 192 has a compound movement on both its idle or retracting stroke and on its cutting stroke. This movement is made necessary by the fact that, due to the compactness of the mechanism, the pivot point 196 of the scissor blade 192 is located so close to the edge

of the receipt web 145 that an exceptionally large angle of movement is required to open the blades far enough to admit the full width of the check. In Figure 4, the floating blade 192 is shown in its completely closed position. Figure 9 shows the floating blade partially retracted, and in Figure 10, the floating blade appears fully retracted with the beveled ear 218 on the slide 216 in its lowermost position.

It will be remembered that the beveled ear 218, on its downward movement, engages the roller 219 on the bell-crank 194 to rock the bell-crank counter-clockwise about its pivot 196 and retract or cock the floating blade 192. During the first part of such retracting stroke, the floating blade 192 and the bell-crank 194 maintain the same relative positions until the outer end of the floating blade 192 strikes a pin 234 in the bracket 193, whereupon, as the bell-crank 194 continues its uninterrupted counter-clockwise movement, the floating blade 192 turns on its pivot 193, since further counter-clockwise movement of the blade 192 is blocked by the pin 234, the result being to rock the floating blade 192 clockwise about its pivot 193, to withdraw the inner end thereof from the path of the paper 45. By providing this compound movement for the severing mechanism, a very small travel of the bell-crank 194 is required to carry the floating blade clear of the path of the paper web.

When the bell-crank 194, under the influence of the slide 216 and the ear 218, arrives at its maximum counter-clockwise movement, a lug 235 (Figs. 4 and 9) on the inner end of the floating blade 192, strikes the pivot 196, to arrest the blade in its retracted position. After the feeding studs 83, 84 and 85 (Figs. 1, 12 and 14) on the Geneva drive disk 80 have completed their action on the Geneva wheel 86, to feed the receipt, which action is completed very shortly before the end of the operation of the machine, as can be seen from Fig. 14, wherein these parts appear in the positions they assume at the end of such operation, the beveled ear 218 (Figs. 4-6, 9 and 10) on the slide 216, on its return stroke, contacts the toe 228, to disengage the latch 226 and release the bell-crank 194 to the action of its drive spring 233, which immediately snaps the bell-crank clockwise until it is arrested by the roller 219 (Fig. 4) striking the ear 218 near the lower end of the bevel thereon, the slide 216 having returned the ear 218 to its uppermost position before the bell-crank 194 was tripped. The compound movement on the down or idle stroke of the floating blade 192 is caused by the continued travel of the pivot 193 of the blade 192 after the forward end thereof strikes the pin 234. The compound movement on the up stroke of the floating blade is caused by a different means, however. At the beginning of its upward or cutting stroke, the inner end of the floating blade 192 starts to sever the receipt from the web. This added resistance at the inner end of the floating blade would normally cause the blade to rock clockwise about the pivot 193, which would tend to bring the blade into parallelism with the receipt web, and defeat the ease of operation of shearing stroke characteristic of the scissor-cutting movement. Therefore, means is provided to overcome this tendency, and combine compactness with ease of operation.

As the bell-crank 194 starts to rotate clockwise under the influence of its drive spring 233, an inclined edge 236 (Fig. 10) on the heel of the floating blade 192, strikes a stud 237 projecting

from the bracket 198, contact with which, due to the force of the spring 233, throws the inner end of the blade upwardly to start cutting while the blade is rocking counter-clockwise about its pivot 193 and the bell-crank 194 is rocking clockwise about its pivot 196. This movement continues until the heel of the blade clears the stud 237, at which time a shoulder 238 on the heel of the floating blade 192 strikes the stud 196, whereupon further counter-clockwise movement of the floating blade 192 about its pivot 193, is blocked. The shoulder 238 is concave to conform to and turn about the cylindrical surface of the pivot 196, and, at the time of contact of the shoulder 238 with the stud 196, the curved edge 239 of the heel of the blade, in which the inclined edge 236 terminates, becomes concentric with the stud 196 and clears the pin 237, thereby locking the heel or inner end of the blade between the pivot 196 for the bell-crank and the pin 237, at the same time permitting the blade to rotate with the bell-crank 194 about the stud 196 to complete the cutting operation. It will be understood that this compound movement occurs at high speed under the influence of the spring 233.

Control of severing means

When the receipt feeding mechanism is disabled by any of the several controls heretofore described, it is also desirable to prevent operation of the severing means, as the repeated operation of the naked blades causes abnormal wear on the cutting edges thereof. Thus, since the scissor-operating means, as illustrated in Fig. 3, functions at each operation of the machine, regardless of whether a receipt is to be issued or not, it is necessary to provide a manipulative coupling to disconnect the scissor-tripping device.

It will be recalled that the ear 218 (Figs. 4, 5 and 6) of the slide 216, on its return stroke, contacts the toe 228 of the trip arm 229 to disengage the latch 226 and release the movable blade of the scissors which was retracted at the down stroke of the slide 216. The trip arm 229 (Figs. 1 and 5) is pivotally supported on the leg 230 of the bail 250 which carries an ear 245 (Fig. 1) to which is pivoted a long link 246 extending downwardly through the printing mechanism and bifurcated at its lower end to loosely straddle a stud 247 projecting from the printer side frame 31. A roller 248 on the link 246 projects across the cammed end 132 of one arm of the control bell-crank 133. As heretofore explained, the bell crank 133 is rocked clockwise by any one of the plurality of means provided for that purpose to disable the receipt feed mechanism, and on such movement the arm of the bell-crank cams the link 246 upwardly slightly to rock the bail 250 counterclockwise, thereby shifting the trip arm 229 towards the front of the machine to position a notch 248 (Fig. 6) in the toe 228 into the path of the ear 218 on the slide 216, so that, on its return stroke, said ear will pass through the notch 248 without rocking the trip arm 229 or releasing the latch 226.

The latch 226, therefore, remains effective to retain the movable blade 192 in its retracted position, until the next operation wherein a receipt is to be issued. The trip arm 229 thus serves as a coupling adjustable under control of the operator to transmit motion from the retracting means to the latch 226 to release or trip the latter.

Hammer disabling

It is also desirable to prevent operation of the

printing hammer 39 (Fig. 1) on operations when no receipt is to be issued. This is likewise conveniently accomplished through the control bell-crank 133 and the link 246.

The remaining leg 249 of the bail 250 carries a laterally extending finger 251 (Fig. 4) which, when the bail 250 is rocked counter-clockwise, as described above, to disable the severing device, swings beneath a projecting shoulder 243 on one of the arms of the hammer 39 to block the impression stroke of the hammer.

The means for disabling the severing means, impression means and the receipt feeding means are all under the control of any of the three manually set drives described above in connection with the receipt feed control, namely, the "on and off" sleeve 143, the control keys 251 (Fig. 15), and the "total lever" 168.

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 as new is:—

1. In a machine of the class described; the combination with means to feed a record material; of severing mechanism therefor, including a floating blade having a heel; a coacting blade overlapped by the heel; a shiftable carrier to which the floating blade is pivoted; tension means operable upon the carrier to press the heel of the floating blade against its coacting blade; and other tension means operable upon the floating blade opposite the heel to press the floating blade against the coacting blade.

2. In a machine of the class described; the combination with means to feed a record material; of severing mechanism therefor, including a floating blade having a heel; a coacting blade overlapped by the heel; a pivotally mounted carrier to which the floating blade is pivoted intermediate its ends; the heel of the floating blade being recessed to embrace the pivotal point of the carrier; means to retract the carrier and floating blade; means to return the carrier and floating blade; and means with which the heel of the floating blade coacts during the first part of such return to control the angle of the floating blade relatively to the coacting blade.

3. In a machine of the class described; the combination with means to feed a record material; of a shears comprising a stationary blade and a floating blade, having a shifting pivot, to sever the record material; means to retract the floating blade; a latch to hold the floating blade retracted; means operated by the retracting means to trip the latch and release the floating blade; and drive means to operate the floating blade to sever the record material.

4. In a machine of the class described; the combination with means to feed a record material; of a shears comprising a stationary blade and a movable blade to sever the record material; a cam slide to retract the movable blade; a latch to hold the movable blade retracted; means operated by movement of the slide to trip the latch to release the movable blade; drive means to operate the movable blade to sever the record material; and means to disable the control of the slide over the blade.

5. In a machine of the class described, the combination with means to feed a record ma-

terial; of a severing means operable in timed relation with the feeding means for the record material, including a movable blade; means to retract the movable blade; a latch to hold the movable blade retracted; adjustable means normally operable by said retracting means to trip the latch; drive means to operate the movable blade; and means controlled at will to shift the adjustable means to prevent its operation by said retracting means to trip the latch.

6. In a machine of the class described, the combination with means to feed a record material; of a severing mechanism for the record material, including a movable blade; means to retract the movable blade; a latch to hold the movable blade retracted; adjustable means operable to trip the latch; the adjustable means having an opening therethrough; a part normally contacting with the adjustable means to operate the latter; drive means for the movable blade; and means controlled at will to shift the adjustable means to position the opening in the path of the part and thus render the adjustable means ineffective.

7. In a machine of the class described, the combination with means to feed a record material and means to disable the former; of a severing mechanism for the record material, operating in timed relation therewith and including a movable blade; means to retract the movable blade; a latch to hold the movable blade retracted; adjustable means operable by the retracting means to trip the latch; the adjustable means having a passageway therethrough; drive means for the movable blade; and means to shift the adjustable member to position the passageway in the path of the retracting means to render the latter ineffective to trip the latch during operations in which the feeding means is disabled.

8. In a machine of the class described, a severing means, including a movable blade; means to retract the movable blade; a latch to hold the movable blade retracted; a coupling between the latch and the retracting means to enable the retracting means to trip the latch; and means to shift the coupling out of the path of the retracting means so that movement of the latter will not be effective to trip the latch.

9. In a paper severing mechanism, the combination of a pivoted carrier; a severing blade pivotally mounted on the carrier and rockable relatively thereto about a pivot located a distance from the pivot about which the carrier swings; means to retract the carrier and its blade; means under control of the retracting means to latch the carrier in retracted position; and means to drive the carrier and its blade on their effective stroke.

10. In a paper severing mechanism, the combination of a pivoted carrier; a severing blade pivotally mounted on the carrier; means to retract the carrier and its blade; an abutment in the path of retraction of the blade and located on one side of the pivot thereof to cause the blade to swing in one direction relatively to its companion blade during retraction; means to restore the carrier and its blade to normal position; and a second abutment located on the opposite side of the pivot of the blade and lying in the path of return of the blade to control its relation to its companion blade on the return stroke.

11. In a paper severing mechanism, the combination with one blade; of a pivoted carrier; a blade pivoted on the carrier, and rockable rela-

tively thereto about a pivot located a distance from the pivot about which the carrier swings; means to retract the carrier; means to insure the withdrawal of the retracted blade from its coacting blade; means to restore the carrier and its blade to normal position; and means with which the movable blade cooperates on its return to normal position to insure a shearing cut.

12. In a paper-severing mechanism, the combination with a blade; of a shiftable carrier; a floating blade pivotally mounted on the carrier; means to retract the carrier and its floating blade; an abutment in the path of retraction of the blade to cause the entire blade to withdraw a distance from its coacting blade; means to restore the floating blade and its carrier to normal position; a second abutment with which the floating blade cooperates on its return to cause the blade to rock on its own pivot in a predetermined direction during the first part of such return; a fulcrum apart from the pivot of the floating blade; and a shoulder on the floating blade adapted to contact the fulcrum to cause the floating blade to turn about the fulcrum as a center during the completion of its return stroke.

13. In a paper severing mechanism, the combination with a blade; of a shiftable carrier; a floating blade pivotally mounted thereon and having a heel; means to retract the carrier and its blade; means to return the carrier and its blade towards the first-named blade; means with which the heel of the blade contacts to control the angle of approach of the movable blade towards the first-named blade during the first part of the return stroke of the blade; a fulcrum; and a shoulder on the heel of the blade adapted to contact the fulcrum to cause the blade to turn about the fulcrum as a pivot during the completion of its return.

14. In a paper severing mechanism, the combination of a shiftable carrier; a blade pivoted intermediate its ends thereto; means to retract the carrier and blade; means to return the carrier and its blade; and means to shift the axis of rotation of the blade from the pivot intermediate its ends to one end of the blade.

15. In a machine of the class described; the combination with means to feed a record material; of a fixed blade; a floating blade; a carrier on which the floating blade is pivotally supported; a slide; a beveled ear on the slide adapted to cooperate with the carrier to retract the floating blade when the slide is moved in one direction; a latch to hold the floating blade and its carrier in retracted position; a coupling whereby the beveled ear when moved in another direction rocks the latch to release the retracted blade and its carrier; and drive means to operate the carrier to cause the floating blade to shear the record material.

16. In a machine of the class described; the combination with a record material feeding mechanism and disabling mechanism therefor; of a fixed blade; a bell crank; a floating blade pivoted on one arm of the bell crank and adapted to be moved across the fixed blade in timed relation to the feeding means to sever the record material; a latch adapted to cooperate with the other arm of said bell crank; means operable in one direction to retract the floating blade and in the opposite direction to actuate the latch to release the bell crank; a coupling to transmit movement from the retracting means to the latch; and means to shift the coupling to ineffective position to disable the latch releasing means during oper-

ations in which the feeding mechanism is disabled.

17. In a machine of the class described; the combination with a record material feeding means and disabling mechanism therefor; of a severing mechanism adapted to operate in timed relation therewith, including a movable cutting blade; a carrier on which the movable cutting blade is pivotally mounted; means to shift the carrier to retract the movable blade; a latch to hold the carrier in retracted position; a coupling intermediate the latch and the retracting means to enable the latter to trip the latch and release the carrier; means to rock the carrier to cause the movable blade to sever the check; and means to shift the coupling to ineffective position relatively to the retracting means during operations in which the feeding means is disabled.

18. In a paper severing mechanism; the combination with a fixed cutting blade; of a pivoted carrier; a floating blade pivoted on the carrier; means operable upon the carrier to retract the floating blade; an abutment in the path of one end of the floating blade to cause the blade to rock about its pivot on the carrier on its retraction; means to latch the carrier in its retracted position; means to release the carrier; means to drive the carrier on its severing stroke; and a second abutment in the path of the opposite end of the floating blade to control the floating blade on its severing stroke and cause the blade to rock about its pivot on the carrier.

19. In a paper severing mechanism, the combination of a shiftable carrier; a movable blade pivotally mounted on the carrier; a latch to hold the carrier in retracted position; means to retract the carrier and to release the latch; drive means to operate the carrier on its severing stroke; and abutments located on opposite sides of the pivotal point of the blade to coast with the movable blade to cause the latter to rotate in one direction about its pivot on the carrier during its retraction and to rotate in the opposite direction on the severing operation.

20. In a paper severing mechanism; the combination of a shiftable carrier; a movable blade pivotally supported on the carrier; means to shift the carrier to retract the movable blade; a latch to hold the carrier retracted; means to connect the retracting means and the latch, and adjustable into the path of the retracting means to enable the retracting means to release the latch and free the carrier and movable blade; means to drive the carrier and movable blade upon their release; abutments in the path of retraction and return of the movable blade to cause the blade to rotate on its pivot on the carrier; and means to withdraw the connecting means to prevent its operation by the retracting means.

21. In a machine of the class described, having record dispensing mechanism; means to feed the record material; means to disable the feeding means; a severing means comprising a stationary blade and a pivotally mounted movable blade to sever the record material; means operating in timed relation with the feeding means to retract the movable blade; a latch to hold the movable blade in retracted position; means operated by the retracting means to trip the latch and release

the retracted blade; and means to render the retracting means ineffective to trip the latch when the feeding means is disabled.

22. In a machine of the class described, in combination with means to feed a record material; of means to sever the record material, including a movable severing member; means operable to cock the movable severing member; means to latch the movable severing member in cocked position; means causing the cocking means to move the latch to release the severing means; and means controlled at will to render operation of the cocking means ineffective to move the latch.

23. In a paper-severing mechanism, in combination with a blade; of a shiftable carrier; a floating blade pivotally mounted on the carrier; means to retract the carrier and its floating blade; an abutment in the path of retraction of the blade to cause the entire blade to withdraw a distance from its co-acting blade when retracted; and a guide means to insure a shearing cut during its return; the guide means including a shoulder on the floating blade, causing the blade to swing through a path non-concentric with its pivot point, upon its return stroke.

24. In a machine of the class described, a severing mechanism including a movable knife blade pivoted intermediate its ends to a driving member, another blade coacting therewith, and means associated with the knife to cause a shearing action of the knife progressively along its edge, the shearing being performed on both sides of the pivot.

25. In a machine of the class described, the combination with means to feed a record material; of means to sever the record material, including a movable severing member; means to cock the movable severing member; means to latch the movable severing member in cocked position; means to move the latch to release the severing member; mechanism movable to a position in which it will render the latch moving means ineffective; and mechanical means to render the latch moving means effective irrespective of the position of the said mechanism.

26. In a calculating machine, a severing mechanism having an operating arm, a knife mounted on a pivot on said arm, said pivot being movable in a definite path by the arm, a cam on the knife, and a stud cooperating with the cam, the parts being so positioned that the path of the knife pivot and contour of the cam together determine the path to be taken by the knife during a severing stroke.

27. In a calculating machine; a severing mechanism including a knife; an arm pivoted to the knife to guide the knife; and a stationary member to further guide the knife, said arm adapted to slide the knife relative to the stationary member when guiding the knife.

28. In a calculating machine, a severing mechanism including a pivoted blade movable about a plurality of pivots during a severing stroke, a mechanical means to move the blade in one direction about one of its pivots, and means coacting with the mechanical means to move the blade in the opposite direction about the other one of its pivots.

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