Sept. 1, 1936. J. F. GOODWILLIE 2,052,821

BOOKKEEPING MACHINE

Filed April 16, 1934 3 Sheets-Sheet 1

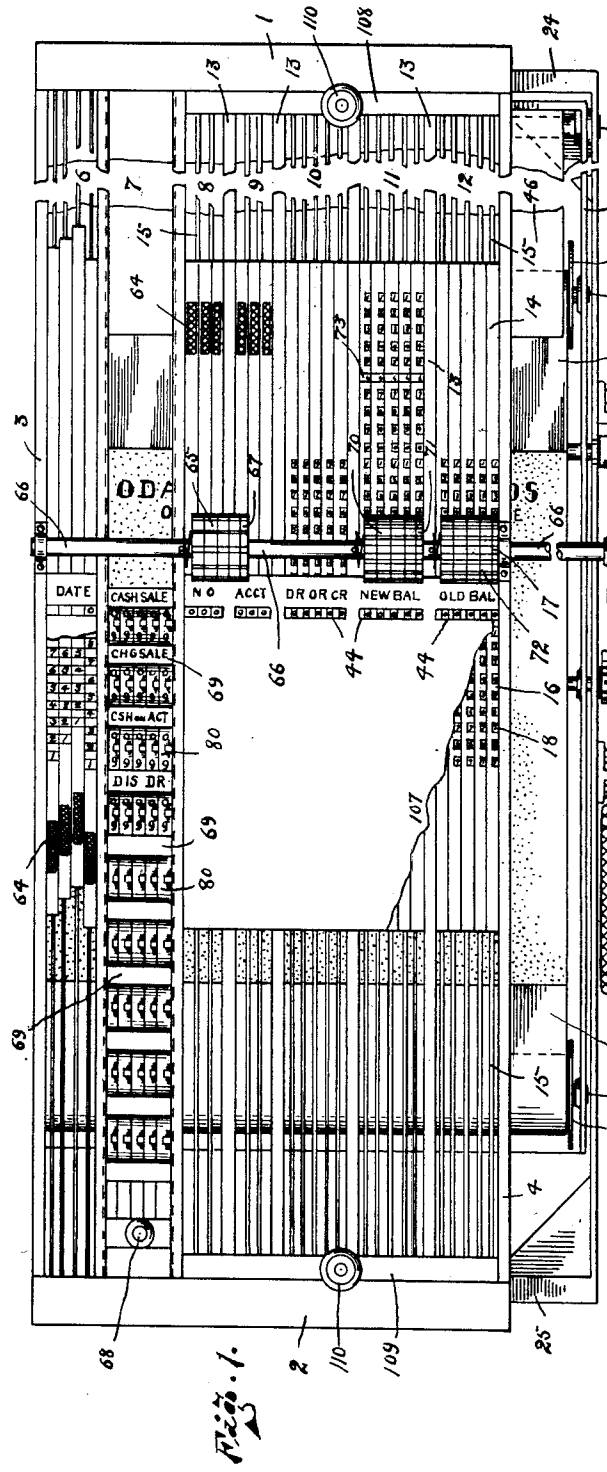


Fig. 1.

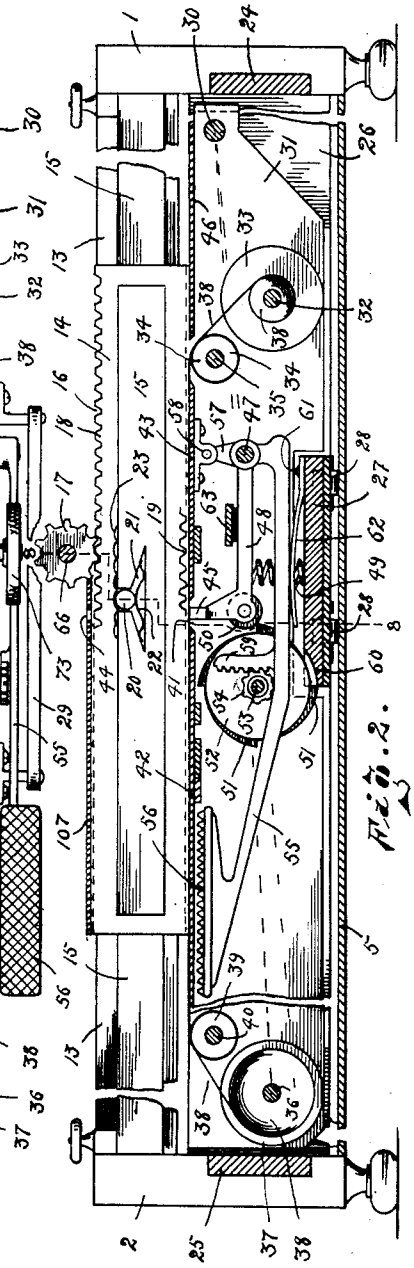


Fig. 2.

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BOOKKEEPING MACHINE

Filed April 16, 1934 3 Sheets-Sheet 2

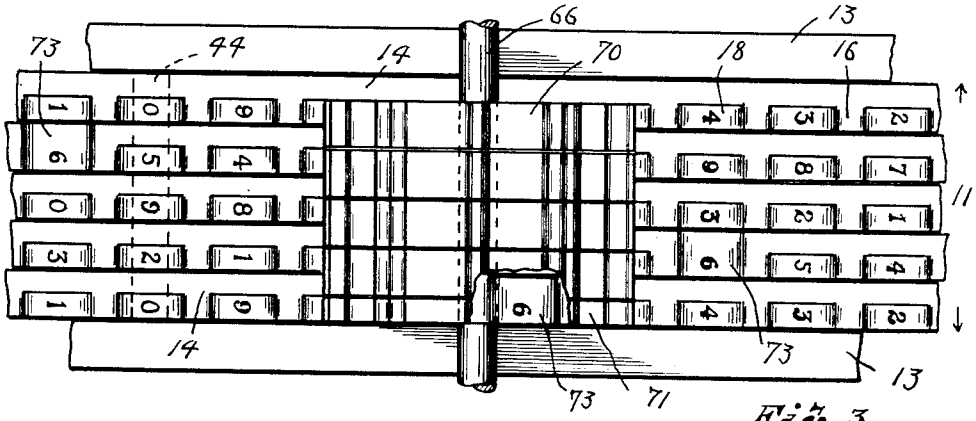


Fig. 3.

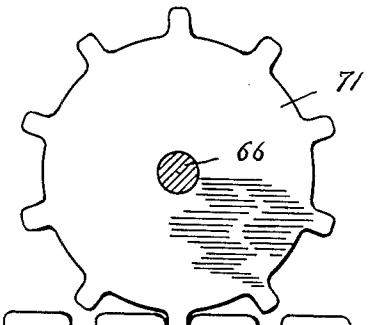


Fig. 4.

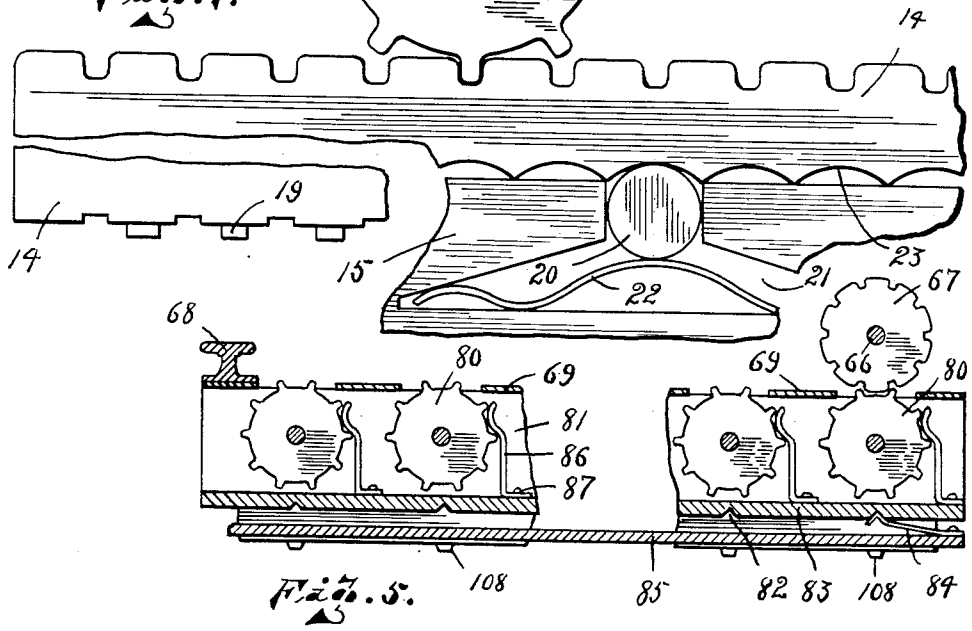


Fig. 5.

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BOOKKEEPING MACHINE

Filed April 16, 1934 3 Sheets-Sheet 3

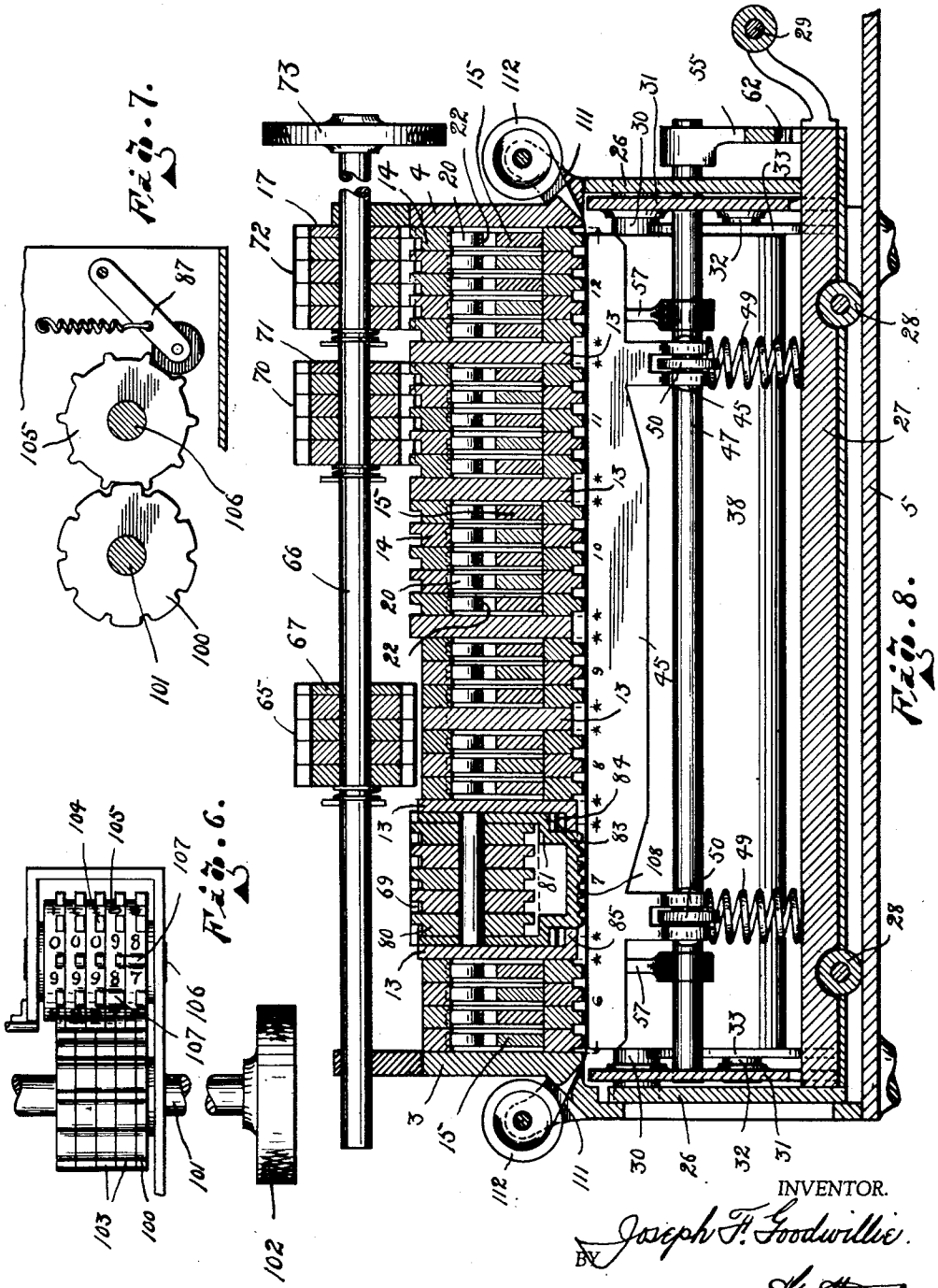


Fig. 8.

Fig. 7.

Fig. 6.

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Patented Sept. 1, 1936

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UNITED STATES PATENT OFFICE

2,052,821

BOOKKEEPING MACHINE

Joseph F. Goodwillie, Duluth, Minn.

Application April 16, 1934, Serial No. 720,825

9 Claims. (235—58)

This invention relates to improvements in a mechanical journal and bookkeeping machine, the principal object of the invention being the simplification of such a device.

Another object is to provide a novel form of type adjustment for printing purposes.

A further object is to provide a simple registering device capable of receiving consecutive values from digit to digit.

Still another object is that of providing simple and expeditious means for the manipulation of paper sheets to and from the machine.

Other objects and advantages of the invention will appear in the following description thereof.

Referring now to the accompanying drawings, forming part of this application, and wherein like reference characters indicate like parts:

Figure 1 is a top plan view, partly broken away and certain details omitted for convenience of illustration, of one of the assembled machines, showing the paper carriage slightly withdrawn laterally.

Figure 2 is a side elevation of Figure 1 with portions of the machine and paper carriage omitted for convenience of illustration.

Figure 3 is an enlarged fragmental portion of the set of type bars in the new balance column with the type setting mechanism shown in cooperation therewith.

Figure 4 is a side elevation of Figure 3 with the type bar broken vertically to illustrate the profile of both upper and lower faces thereof and showing the detent for the bar.

Figure 5 is an enlarged side elevation of a fragmental portion of the series of selective balance registers, illustrating the carrier of said registers in section.

Figure 6 is an enlarged top plan view of a set of register devices of the type employed in the selective balance counters.

Figure 7 is a side elevation of the assembly shown in Figure 6, illustrating a modified form of step by step detent attachment.

Figure 8 is a section on substantially the line 8—8 of Figure 2, with the register carriage, in column 7, in position for printing.

The housing of the machine is preferably of rectangular form, comprising the end walls 1 and 2, side walls 3 and 4, and bottom wall 5. The side walls 3 and 4 are relatively narrow and the space intermediate of the upper portions of same is divided into seven narrow compartments or spaces hereinafter referred to as columns 6, 7, 8, 9, 10, 11 and 12, which spaces or columns are separated by the narrow fixed walls 13.

Within all of the columns, save that indicated at 7, are reciprocable type bars; those in the columns 6, 8 and 9 being directly selectively operable by hand, while those illustrated in the columns 10, 11 and 12 are indirectly operable manually.

I will now proceed to describe one of the latter more specifically.

One of such type bars is illustrated at 14 and is of open construction in side elevation and slidably mounted upon the thin metal carrying strip 15, there being one of such strips for each bar and these strips are each securely mounted within the end walls 1 and 2 of the machine housing. The upper edge of the type bar is formed with a plurality of notches as at 16 resulting in a cogged surface for engagement by the cogged driver or master disc 17, and the flat surface of each cog 18, intermediate of the notches 16 on the bar, carries a numeral. These numerals commence in the centermost cogs of the bar with "0" and those in the column 12 number consecutively from 1 to 9 in one direction and from 9 to 1 in the opposite direction; while those in the column 11 increase in value consecutively in one direction therefrom including two complete units of digits from 0 to 9, and decrease in the opposite direction including two complete units of digits from 9 to 0; whereas those in the column 10 increase consecutively from 0 to 9 in either direction. The upper cogged surface of each bar 14 in column 11 is further peculiar in that these cogs occur only upon the outer half of such surface, except where a double cog 73 appears see Fig. 3, it being the full width of such surface, the object of which will be described later. The upper portion of all type bars may be covered upon the front side of the shaft 66 as for example by the covering plate 101 which is provided with suitable window openings 44 through which single digits on the bars may be viewed as the same are set up.

Now, the under edge or bottom of each type bar is provided with a similar cogged surface 19, said cogs carrying type for printing purposes and each type being a duplicate of the digit directly thereabove; such type being for the purpose of printing the result of whatever calculations are set up by the mechanism for such purpose.

It is essential that the type bars 14 move a positive step in either direction when adjusted and to assure such step by step movement I have illustrated each strip 15 as carrying centrally thereof a thin floating roller 20 within the triangularly shaped cut-out portion 21 in each strip. Beneath each roller 20 is a flat expansive spring 22 for normally biasing the roller in upward position for

progressive engagement within the arcuate notches 23 in the under edge of the upper portion of each type bar so that as the bar is progressed in either direction the roller will assist in maintaining its proper position.

The column spaces 6, 8 and 9 are provided with type bars similar in all respects to those previously described except that they are not cogged or notched upon their upper faces for mechanical operation but rather provided with either knobs or knurled surfaces as at 64 for convenient manipulation in sliding such bars back and forth. They are however provided with notches for registration with spring pressed rollers, like those described at 20. The space column 6 has four such bars by which the date of the entry may be printed, and the space column 8 with three of such bars to print the number of the entry, and the space column 9 also has three bars to print the number of the account.

In providing for the printing operation of the device I have illustrated the drawer-like structure, the ends thereof being shown at 24 and 25, while the outermost side walls are shown at 26—26, and a centrally positioned cross member or bottom section is illustrated at 27; this latter carrying suitable rollers or skid members 28 for engagement upon the bottom 5 of the machine proper so that the drawer may be readily slid laterally to or from the machine and for convenience of such operation I have illustrated the handle 29, as shown in cross-section Figure 8 and in partial plan view in Figure 1.

In this platen drawer is pivotally carried adjacent one end as at 30 the platen frame 31 with the free end of said frame being susceptible of slight raising and lowering motion, it however not being attached in any manner to the cross-bar 27 of the drawer. Mounted within the side walls of the platen frame 31 and near the forward end thereof is the spool or reel carrying shaft 32 for support of the paper winding spool illustrated at 33, and just above and rearwardly of said shaft and spool is the idling roller 34 mounted upon the shaft 35, while at the opposite end of the platen frame is a similar shaft 36 carrying the roll spool 37 and upon which is shown the roll of paper 38 leading upwardly over the idler 39 on the shaft 40 and it is intended that a constant winding up tension shall be applied to the shaft 32 and roller 33, hereinafter more fully described.

The journal sheet roll of paper 38 is illustrated as being mounted upon the spool 37 and leading over the roller 39 on top of the reciprocable platen, one section of which is shown at 42 and the other at 43, and between which sections is illustrated a transverse opening 44 through which the hammer 45 operates. A fixed continuation of the platen or platform construction is illustrated at 46 forwardly of the roller 35 for convenience in receiving removable printed matter and copies if desired from the journal strip.

A shaft 47 is journalled transverse the platen frame and pivotally carries loosely thereupon the type hammer bars or arms 48, of which there are two, and which carry the transverse type hammer head 45. Beneath each of these arms 48 is mounted an expansive helical spring 49 to bias the type bar upwardly and each arm 48 carries upon its free end a roller 50 designed to progressively engage the eccentrically formed teeth 51 on the disc 52 fixedly carried upon the shaft 53, rotatably mounted within the platen frame. Upon this shaft 53 is also fixed the small spur gear 54 which has associated therewith a common ratchet attachment not shown whereby only clockwise rotation of the pinion will affect and so rotate the shaft with its discs.

The operating lever of the printing mechanism is shown at 55 and terminates at its free end in a suitable thumb tread 56 for manipulation by the operator. At the opposite end it is keyed to the shaft 47 for rotating same. Inwardly upon said shaft are keyed hubs carrying the crank arms 57 pivotally connected as at 58 to the under side of the section 43 of the reciprocal platen. Intermediate of the ends of the lever 55 and in constant mesh with the pinion 54 is an upstanding rack 59 for operation of the pinion so that when the free end of the manipulating lever 55 is depressed the pinion 54 will be rotated in a clockwise direction together with the discs 52, and the eccentric cams or teeth 51 will engage the arcuate track 60 in the front edge of the bar 27 of the drawer and also engage the roller 50 in the free end of the printing bar or arm 48; it being understood that there is one of such arms with associated parts adjacent either side of the platen frame and carried thereby, but only a single operating lever 55.

Beneath this lever 55 and fixed as at 61 is a leaf spring 62 for keeping the free end of the lever 55 in its uppermost position. The position of the operating mechanism as illustrated in Figure 2 of the drawings is that which occurs immediately after the printing bar has struck upwardly and printed, when, of course, the lowermost one of the eccentrics 51 will have slipped over the end of the track 60 on the bar 27 and the entire platen frame will have dropped to its lowermost position when the discs 52 will rest in their respective tracks or bearings upon the bar 27, with the arms 48, of course, remaining in their uppermost position against their respective resilient stops 63, said stops permitting an impression to be taken but immediately thereafter withdrawing the hammer 45 from contact with the type and lowering the platen 42—43 slightly away from the face of the type 14, thus freeing the platen frame and drawer so that the latter may be withdrawn, and the original with copies if any of the printed matter removed, and new blank sheets readily insertable prior to return of the drawer to printing position.

Of course there is provided any suitable arrangement of inking ribbon such as illustrated at 111 with spools 112 upon either side of the machine therefor and operated either manually or automatically as preferred.

When the drawer is returned to printing position and a new set-up of the type bars made ready for another operation of printing, pressure downward on the thumb plate 56 will rotate the discs 52 and the succeeding cam 51 on said discs will commence engagement of its track in the cross bar 27 and proceed to lift the entire platen frame simultaneously with the forcing down of the printing bar by the next following cam tooth 51 bearing against the roller 50 until the platen, with its sheets thereupon, is presented or brought tightly up against the type on the bars 14 at which time the cams 51 engaging the rollers 50 will slip past same, allowing the type bar to spring up and strike the type just prior to the preceding cam dropping from its track on the bar 27 allowing the platen rack to again drop, ready for subsequent operation.

Now at each of said operations it is evident that the crank 57, being attached to the mov-

able portions of the platen will, at each stroke downwardly of the lever 55, move the platen slightly forwardly, and when the lever returns to its uppermost position will move the platen slightly backwardly, biasing the record or journal sheet towards a slight forward movement which is equal to a proper line spacing on the sheet, and, as before stated, the journal sheet, being normally biased in forward direction although not sufficiently so for independent movement, will instantly respond and will be advanced one line space.

While I have illustrated means for automatically operating the journal tape step by step so as to provide the proper spacing of the lines of printing, it is obvious that this may be dispensed with and inasmuch as in many instances but a line of work is reproduced at a time on a single sheet, the manipulation of same, as well as the operation of the journal tape, may be accomplished by hand.

In the space column 7 is shown a plurality of groups of cogged counter discs 80 having numbers from 1 to 10 intermediate of the circumferentially cogged surfaces thereof, which groups are for selective registration with and operation by the group of tumblers 65 upon the transverse shaft 66 operable in conjunction with the driver disc 67, identical with the disc 17 previously described, there being such a driver disc associated with each drum of tumblers. I have shown in this instance but five of such counter discs in each group as being sufficient for the ordinary bookkeeping accounts, being able thereby to record any number of dollars up to one thousand less one.

There are ten of such registers each consisting of five counting drums in the slidable carriage 81 within the column space 7 said carriage being slid manually by the thumb button 68 or other suitable device. At the head or in front of each register is a section of covering plate such as shown at 69 for reception of the title of the respective registers. For example the first one is shown as representing the cash sales, the next charge sales, the next cash on account, etc., thus providing means whereby the net aggregate of consecutive transactions may be registered under any separate captions peculiar to any business, and it is to be understood that transverse the lower face of the register carriage 81 are lines of type 108 corresponding to those directly above so that the title of the transaction is simultaneously printed at each action of the machine.

The process of accomplishing such registration simply necessitates the sliding of the carriage carrying such plurality of registers therein until a desired register is in proper alignment with the operating drum 65 including its actuator disc 67; accurate alignment of the carriage 81 being accomplished by a detent mechanism comprising notches 82 transverse the bottom of the edges 83 of said carriage engaging the upwardly biased, flat, angularly terminaled spring 84 fixed to the edges of the bottom 85 of the column 7, and of which springs 84 there may be any desired number.

As a means for retaining each counter disc 80 in its proper alignment I have shown the upstanding spring member 86 (Fig. 5) as being arcuate in shape to fit intermediate of any pair of cogs on the circumferential surface of each disc, there being such a spring for each disc, or, if preferred, a spring and roller attachment such as shown in Figure 7 at 87 may be employed. Furthermore it is to be understood that the tumblers in the drum 65 for engagement with the discs 80 may also be provided with suitable step by step retaining means such as either of those just described.

The column spaces 10, 11 and 12 are each provided with five type bars 14, the column 10 being used for the debit or credit record; the column 11 for the new balance; and the column 12 for the old balance, as indicated. The drum of tumblers 70 with its actuator disc 71 is adjustable by longitudinal movement of the shaft 66 in either direction for cooperation with the type bars in either column 10 or 11, while the drum of tumblers 72 with its actuator disc 17 is shiftable to cooperate with any of the type bars in the columns 11 or 12; it being understood that the drum 65 and actuator 67 only cooperates with any one of the registers in column 7 and that control of any of the type bars in column 12, representing the old balance by the drums 72 and actuator 17, does not affect the counters in column 7, but of course does operate the corresponding type bars in the new balance column, as one balance cannot be altered without affecting the other. When, however, the drum 70 and actuator 71 are moved, by manipulating the shaft 66, over the type bars in column 10 for setting up therein a specific debit or credit transaction, the drum 65 and actuator 67 will have been simultaneously moved over the previously selected register, as well as the drum 72 and actuator 17 being moved over the type bars in column 11, and therefore, since all actuators act simultaneously, any entry indicated in column 10 by the actuator 71 and drum 70 will be simultaneously entered in the register in column 7 and in the new balance in column 11.

It is to be noted that one of the principal features of the present invention is that of the type bars 14 which are horizontally reciprocable to any desired position by means of the actuator discs 17, 71 or 67 and associated tumblers either for addition or subtraction and at the same time presenting type for printing purposes therebeneath. The cogs on the upper surfaces of the bars, it will be noted, particularly in Figure 3, are but half the width of the bar, and since the actuator discs 17, 71 or 67 are also but half the width of the bars, and their associated tumbler discs are the full width thereof, it follows that when a drum of tumblers and its actuator disc, for example 70 and 71, are over a group of rack bars as indicated in Figure 3, each tumbler disc will overlap a pair of type bars. And since the bars in column 11, which is the new balance column, must be capable of adding or subtracting, provision is made for a carryover by enlarging each tenth cog in each bar to the full width of said bar, as is indicated at 73. Now when the actuator tooth engages a full width cog and moves it, the cog will in turn move the overlapping tumbler disc next adjacent the actuator disc, and that tumbler disc, since it also overlaps the next adjacent type bar, will move it, thereby accomplishing the desired carryover.

Each drum of tumblers 65, 70 or 72 is composed of the desired number of tumbler discs and one actuator disc, the latter being as illustrated but one-half the width of the type bars or register wheels, and fixed to the shaft 66, so that any operation of the knurled operating wheel 73 correspondingly moves each actuator

disc simultaneously, without disturbing tumblers 65, 70 or 72. This is believed a novel construction of counting mechanism, as it permits of the actuator discs operating any type bar; in other words the actuator disc is capable of actuating either the units, tens, hundreds, thousands, or tens of thousands digital orders depending upon the lateral adjustment of shaft 66 and actuators 67, 71 and 17.

In registering it will be noted that the actuator disc operates in moving each cog of the engaged type bar in column 11 or register wheel in column 7 consecutively until a double width cog 73 on the type bar or a double width cog 107 on a register wheel is reached. This cog engages not only the tooth of the actuator disc but also that of the next adjacent tumbler disc, and accordingly when the actuator disc moves the double cog the latter correspondingly moves the next adjacent tumbler disc, which in turn moves the next adjacent type bar or register wheel, since the tumbler disc overlaps the same, and thus a carryover is accomplished.

In operation, the customer's ledger sheet is taken from the ledger drawer, and the number of the account and the old balance determined therefrom, and the date, number of the account, and number of the transaction, is set up manually in columns 6, 8 and 9 by manipulation of the type bar knobs 64, when the drum of tumblers 72 and actuator disc 17 are moved so as to be over and ready to operate the type bars in column 12, and the old balance as determined from the ledger sheet set up therein. Let us assume that this old balance was $25.52. This amount would be set up in the old balance column 12 by sliding the disc 17 over the tens of dollars bar and setting up "2"; then to the dollar bar and setting up "5"; then to the tens of cents bar and setting up "5"; and then to the unit cents bar and setting up "2". Since disc 71 and tumblers 70 operate simultaneously with 17, and tumblers 70 operate simultaneously with 17 and 72, this same amount $25.52 would have been set up in the new balance column 11. Then the charge sale register 80 would be slid up until it would be in line with the disc 67 and tumblers 65, when the shaft 66 would be slid laterally until 17 and 72 were over column 11; 71 and 70 over column 10; and 67 and 65 over the charge sale register in column 7. Then the amount of the charge sale transaction, say for example it was $5.55, is set up in column 10 in the same manner as the old balance was set up in column 12. This automatically adds the amount of the transaction in the column 11 showing the new balance of the customer's account, and also automatically adds the amount of the transaction to the total of all charge sale transactions in the register in column 7; leaving the old balance undisturbed.

The ledger sheet of course is placed on the platen with the proper blank line thereon over the opening 41 so as to print in the proper space, and the lever 56 is then operated, simultaneously printing the new transaction on the ledger sheet and journal sheet. The type bars may then be returned to normalcy by manipulation of either or both the cross bars 108 and 109 each of which carries a centrally disposed knob or button 110 for such manipulation.

In Figures 6 and 7 is illustrated a simple combination of the computing device embodying the invention and which may be used for other computations than required in bookkeeping, as previously described.

In these views 100 represents the driver disc keyed to the shaft 101 operated by the hand wheel 102, and 103 are the tumblers loosely mounted on the shaft 101 which in turn are operated by the double cogs, illustrated at 107 upon the group of record keeping discs 105, all of which are in engagement with the tumblers and counter disc previously described, they being loosely mounted upon the shaft 106. The single cogs on said discs are illustrated at 104.

In Figure 7 is illustrated a practical form of spring controlled keeper for all of the record keeping discs so that they are held in alignment whether engaged with the driver discs or not, such mechanism being illustrated at 87, and previously referred to.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. In a computing device, a series of selectively longitudinally movable registers each comprising separately rotative circumferentially cogged register discs, and a second series of cogged discs in parallel alignment with the first series and movable laterally into intermeshable engagement with the discs of a selected register, one of the second series of discs being the actuator disc and capable of imparting motion to any one of the register discs directly, and indirectly to other register discs through the medium of one or more of the remaining discs in said second series.

2. In a computing device of the character described, a manually rotatable and reciprocable shaft, a plurality of groups of circumferentially cogged discs mounted upon said shaft, one only of said discs in each group being fixed to the shaft, a plurality of registers mounted adjustably relative to said shaft for selective engagement with one of the groups of discs upon the shaft, a plurality of reciprocal computing elements for selective engagement with another of the groups of discs upon the shaft, and means whereby said computing elements and a selected register are operable simultaneously by their respective discs upon said shaft.

3. In a computing device of the character described, a manually rotatable and reciprocal shaft, a group of circumferentially cogged discs mounted upon said shaft, a reciprocal carriage beneath said shaft and movable at right angles to the axis thereof, a plurality of groups of computing elements within said carriage each for selective engagement with and operation by said group of discs upon the shaft when the latter is reciprocated for such engagement.

4. In a computing device of the character described, a manually rotatable and reciprocal shaft, a plurality of groups of circumferentially cogged discs mounted upon said shaft, a reciprocal carriage beneath said shaft and movable at right angles to the axis thereof, a plurality of groups of rotatable computing elements within said carriage each for selective engagement with a certain group of discs upon the shaft when the latter is reciprocated for such engagement, and a plurality of reciprocal computing elements beneath said shaft and movable simultaneously with the selected group of rotatable computing elements by the action of another group of said discs on said shaft.

5. In a computing device of the character described, a plurality of groups of reciprocal computing elements, a plurality of groups of selectively adjustable rotatable registering devices, a

manually operable shaft rotatably and reciprocally carried above said computing elements and registering devices, a plurality of groups of rotatable actuating discs upon said shaft, two of said groups of discs on the shaft being selectively operable with the reciprocal computing elements and one of said groups of discs on the shaft being selectively operable with a selected one of the groups of said rotatable registering devices.

6. In a computing device, a plurality of registers mounted in spaced relation in a slidable carriage, each register comprising a plurality of discs having circumferentially cogged surfaces, a plurality of cogged register racks, an operating shaft, a plurality of actuating drums comprising tumbler discs and actuator discs on said shaft, one drum for operating a register and another for operating the register racks simultaneously.

7. In a computing device, a plurality of registers mounted in spaced relation in a slidable carriage, a plurality of register racks, an operating shaft transverse to said registers and racks, a plurality of actuating drums comprising tumbler discs and actuator discs on said shaft, and means for moving said shaft laterally to bring said drums into or out of operative engagement with said registers and racks.

8. In a computing device, a series of selectively longitudinally movable registers each comprising circular cogged discs, a group of circular cogged discs for operating a selected register, a shaft for said operating group, one disc only of the operating group being fixed to said shaft and being the actuator disc of the group and selectively operable with any of the discs of the selected register, said registers being movable at right angles to the operating group for bringing a selected register into or out of intermeshed engagement therewith.

9. In a computing device including a reciprocal shaft, a series of circumferentially cogged rotative discs mounted upon said shaft, a plurality of series of cogged discs adjustable at right angles to the axis of said shaft into intercogged relation with said first mentioned series, and a manually slidable rack on which said plurality of series of cogged discs are mounted, each series being for selective engagement with said first mentioned series.

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