

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 1

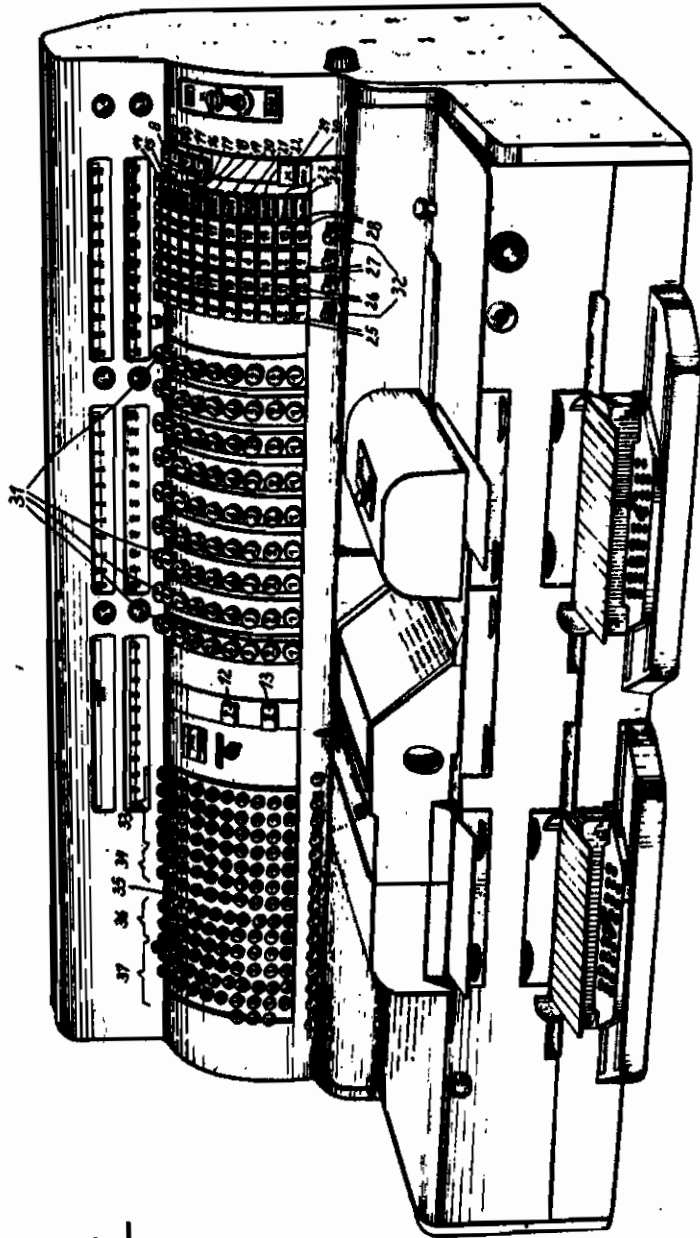


Fig. 1

KURT AURBACH,  
INVENTOR

BY *Knight Bros*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

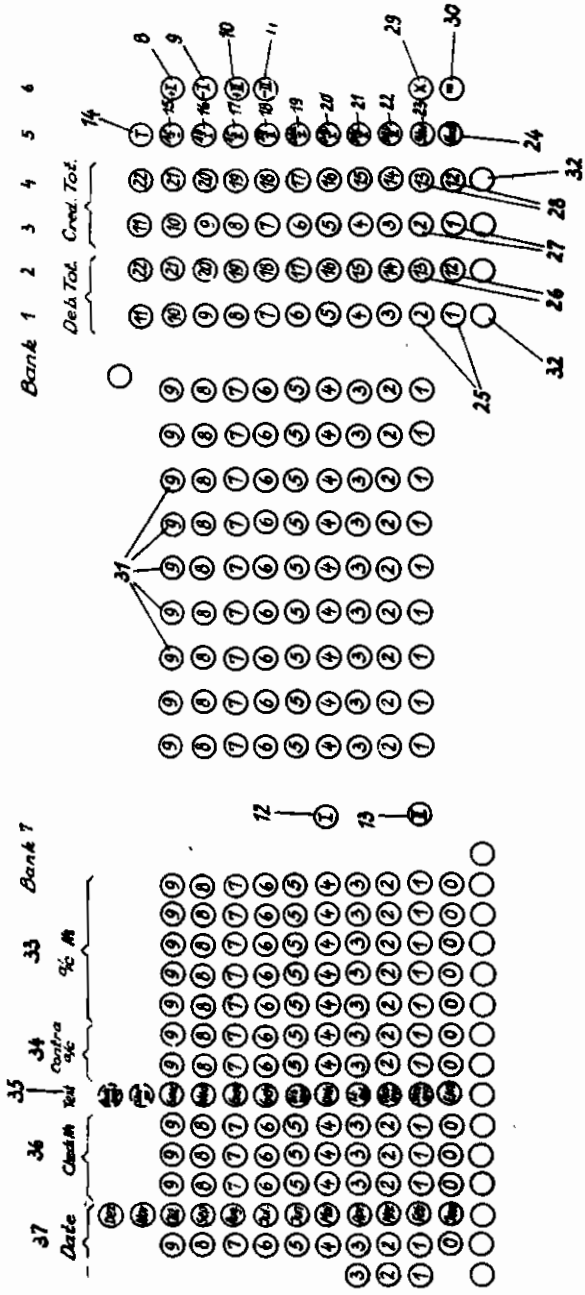
PRINTING MECHANISMS FOR BOOKKEEPING MACHINES. 226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 2

Fig. 1a.



KURT AURBACH  
INVENTOR

BY *Knight Bros*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

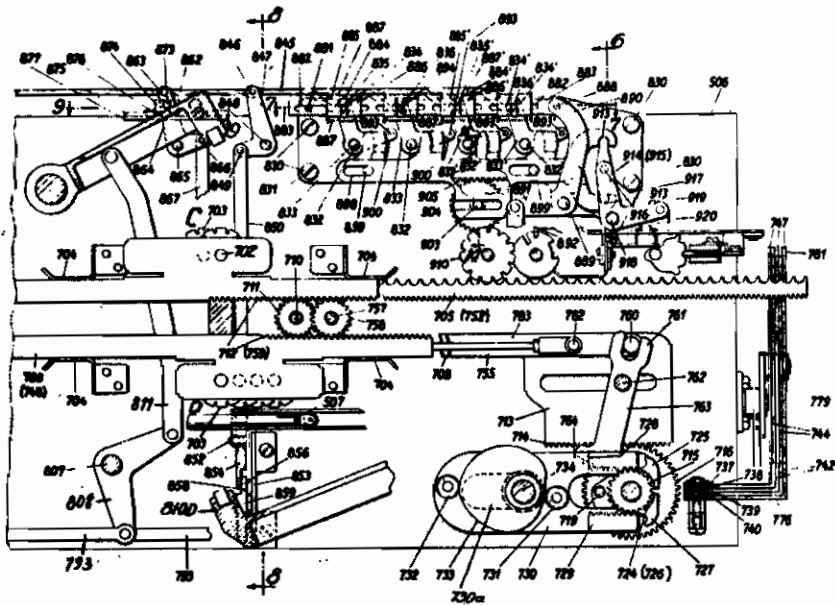
226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 3

Fig. 2



KURT AURBACH  
INVENTOR

BY *Knight Bros*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 4

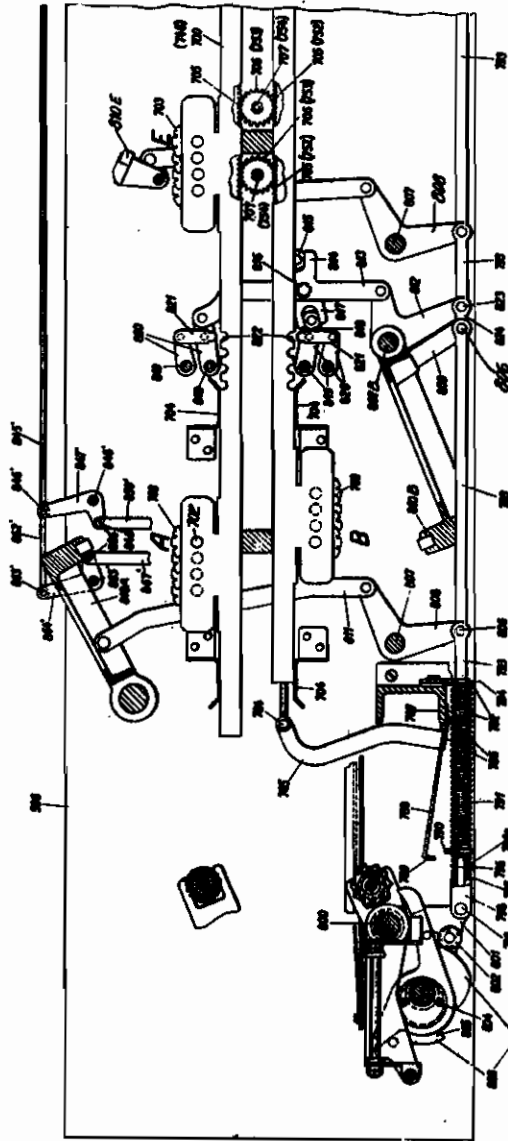


Fig. 2a

KURT AURBACH  
INVENTOR

BY

Knight Bros

ATTORNEYS.



PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

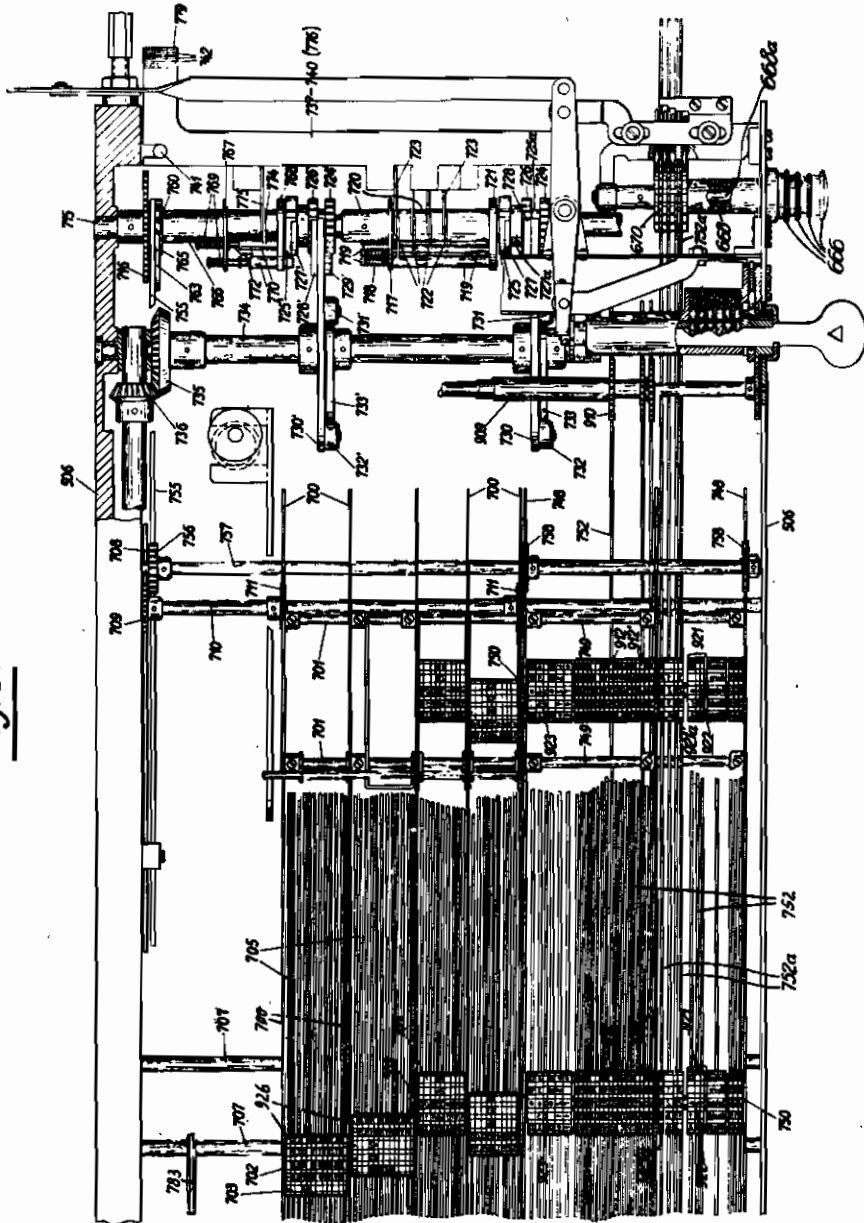
226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets—Sheet 6

Fig. 3.



KURT AURBACH  
INVENTOR

BY *Knight Bros*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943. PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

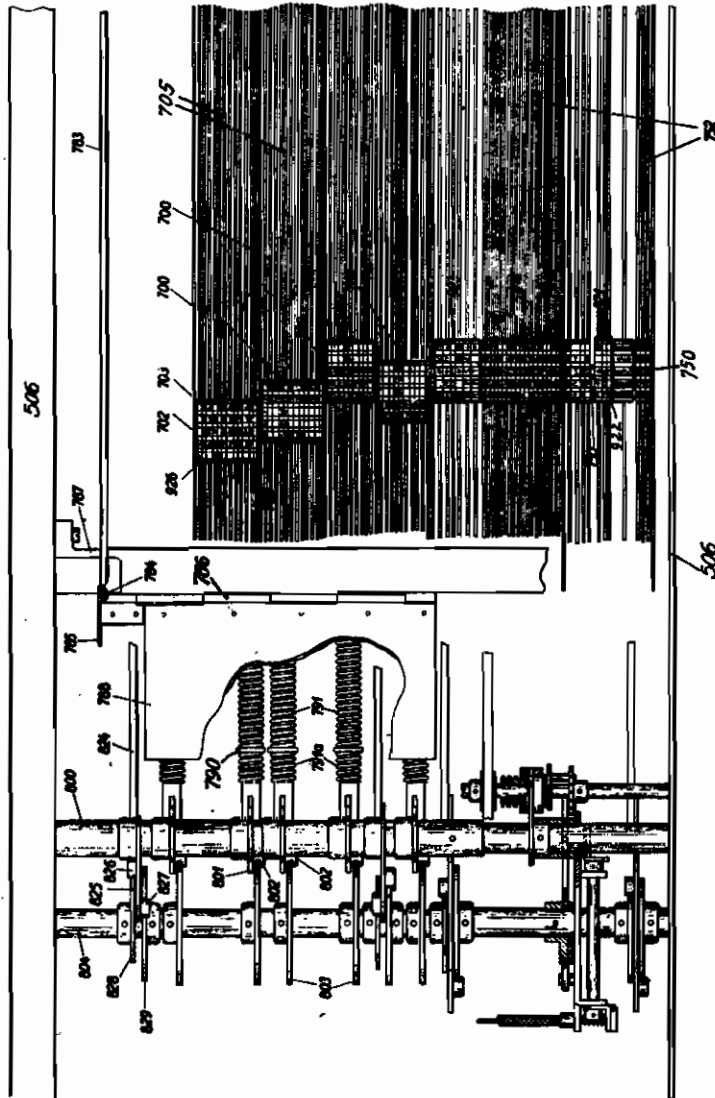
226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 7

Fig. 3a.



KURT AURBACH  
INVENTOR

BY *Knight*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

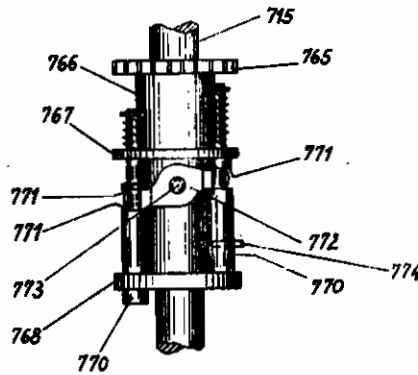
226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 8

Fig. 4



KURT AURBACH  
INVENTOR

BY

*Knight Bros*

ATTORNEYS.



PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943. PRINTING MECHANISM FOR BOOKKEEPING MACHINES

226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 9

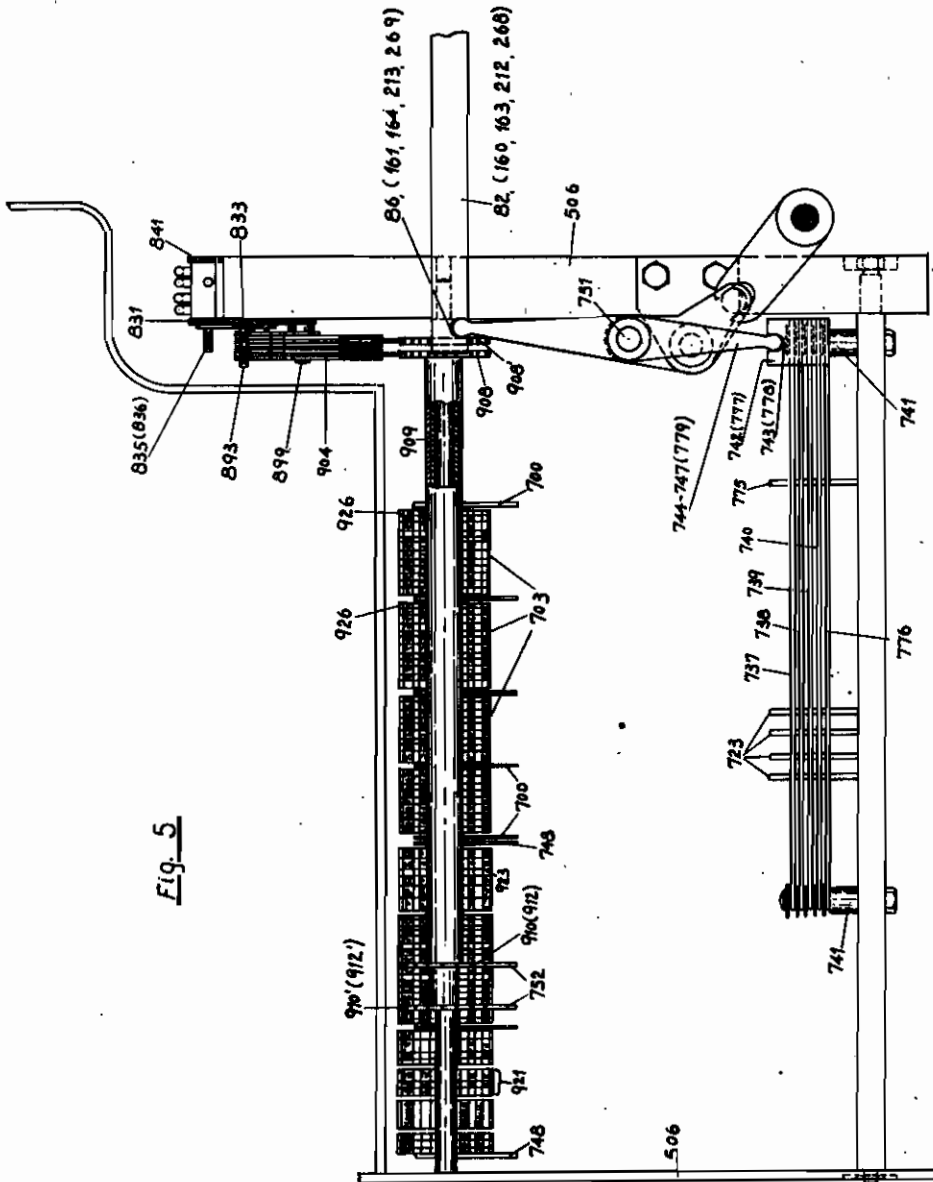


Fig. 5

Kurt Aurbach  
Inventor  
By Knight Bros  
via Attorneys

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

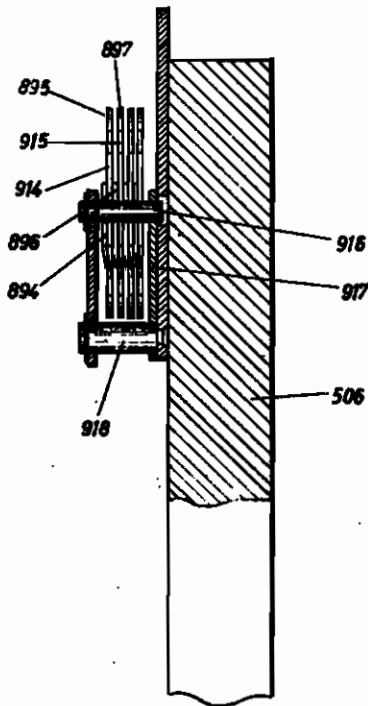
226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 10

Fig. 6



KURT AURBACH  
INVENTOR

BY *Knight Bros*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

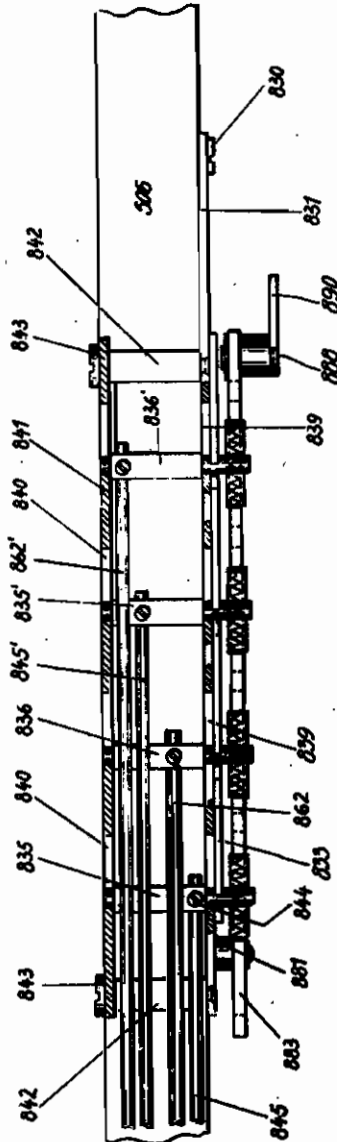
226,467

BY A. P. C.

Filed Aug. 24 1938

27 Sheets-Sheet 11

Fig. 7.



KURT AURBACH  
INVENTOR

BY *Haight Bro*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943. PRINTING MECHANISMS FOR BOOKKEEPING MACHINES 226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 12

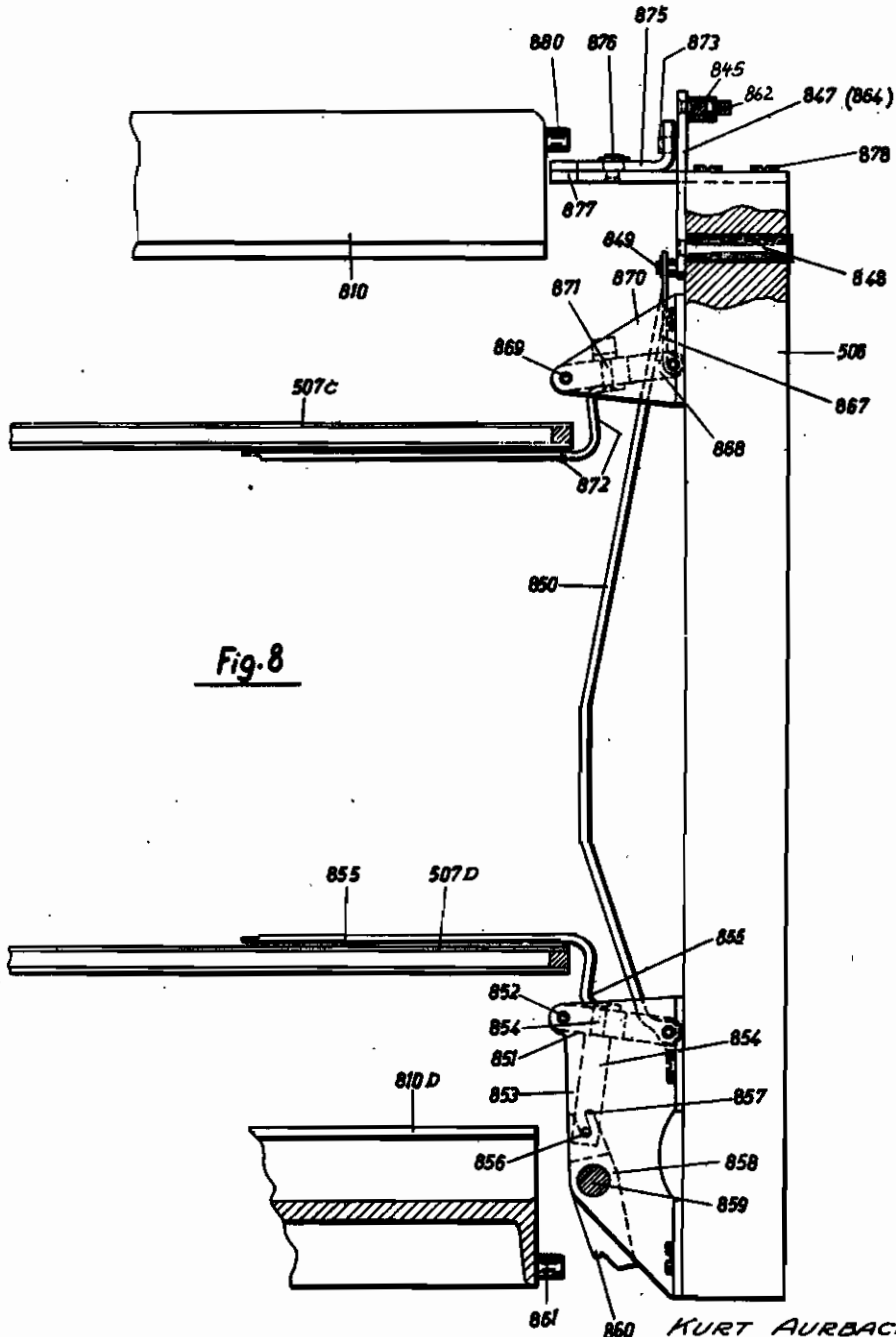


Fig. 8

860 KURT AURBACH  
INVENTOR

BY *Knight Broo*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

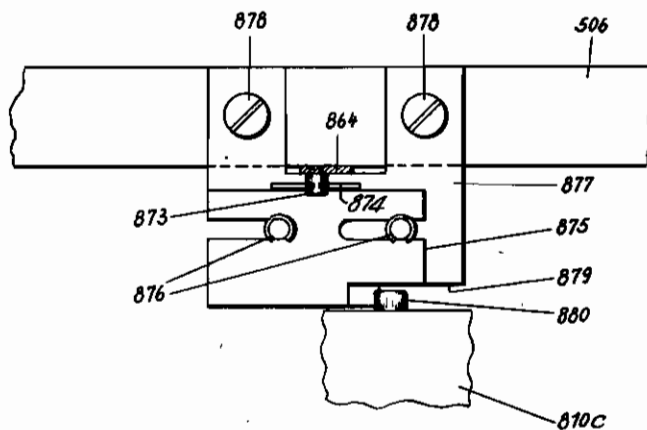
226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets—Sheet 13

Fig. 9



KURT AURBACH  
INVENTOR

BY *Haight Bro*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943. PRINTING MECHANISMS FOR BOOKKEEPING MACHINES **226,467**

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 14

Fig. 10

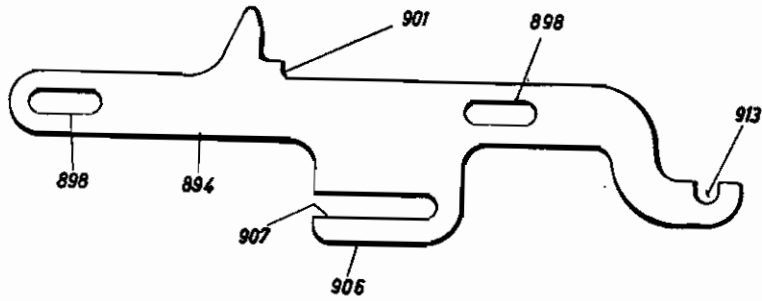


Fig. 11

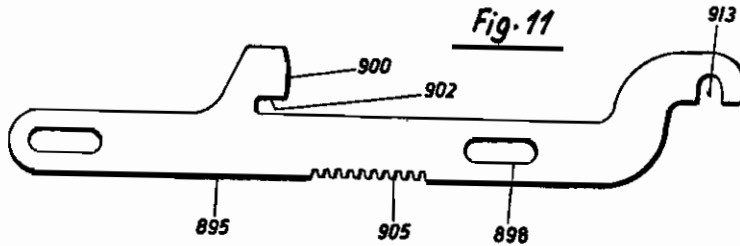


Fig. 12

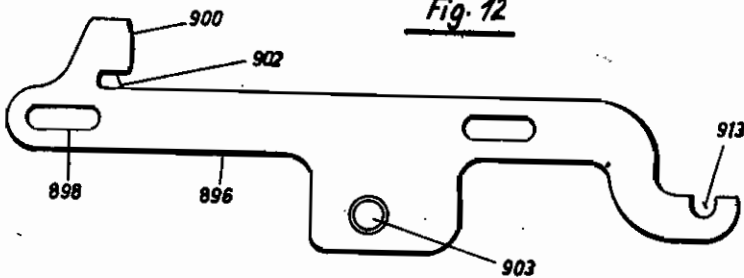
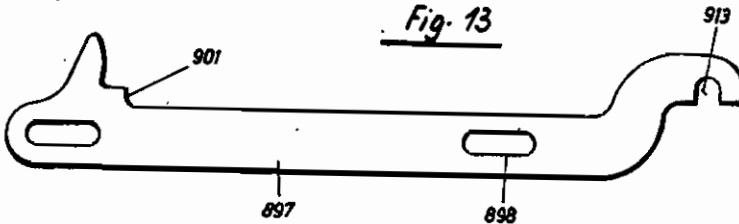


Fig. 13



KURT AURBACH  
INVENTOR

BY *Knight Bro*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets—Sheet 15

Fig. 14.

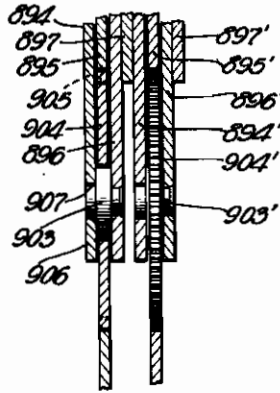
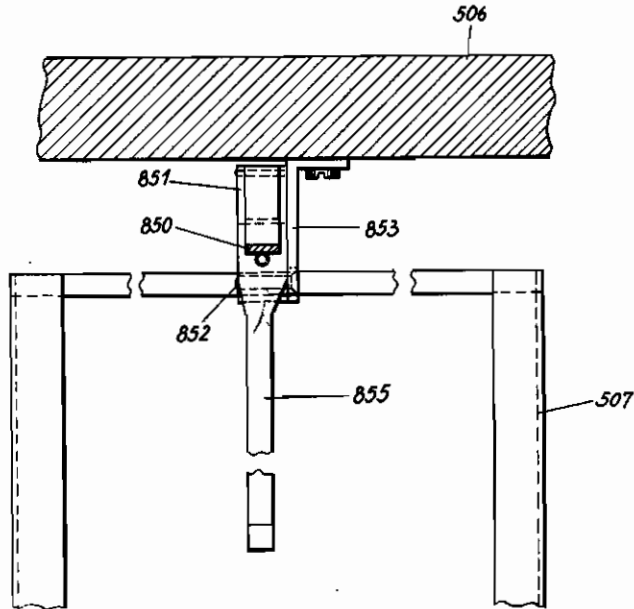


Fig. 15.



KURT AURBACH  
INVENTOR

BY *Knight Bro*

ATTORNEY.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 16

Fig. 16 a.

Fig. 16.

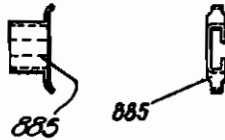
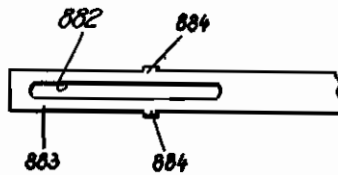


Fig. 17



KURT AURBACH  
INVENTOR

BY

*Knight Bros*

ATTORNEYS.



PUBLISHED  
MAY 4, 1943.  
BY A. P. C.

K. AURBACH  
PRINTING MECHANISMS FOR BOOKKEEPING MACHINES  
Filed Aug. 24, 1938

Serial No.  
**226,467**  
27 Sheets-Sheet 17

Fig. 18.

Account Card.

Li	Check No	Text	Posting Date	Comp. %	Account Totality	Debit	Credit	New Balance	Old Balance
1								*****250.00-	*****1000.00-
2	925	Check 14.12	12.12	84.81	12456	1250.00			
3	200	Check	20.2	84.81	15682		*****350.00	*****100.00-	
4									
5									
6									
7									
8									
9									
10									

KURT AURBACH.  
INVENTOR  
BY *Haight Bros*  
ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 18

Fig. 10.

Contra Account Card.

Line No.	Check No.	Posting Date	Amount	Account	Debit	Credit	New Balance	Old Balance
1								1000.00
2	123	14. 12	48.48	123456	48.48			
3	200	20. 2	48.48	123456	48.48			
4								
5								
6								
7								
8								
9								
10								
					350.00	1250.00	250.00	250.00
							100.00	

KURT AURBACH  
 INVENTOR  
 BY *Knights*  
 ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

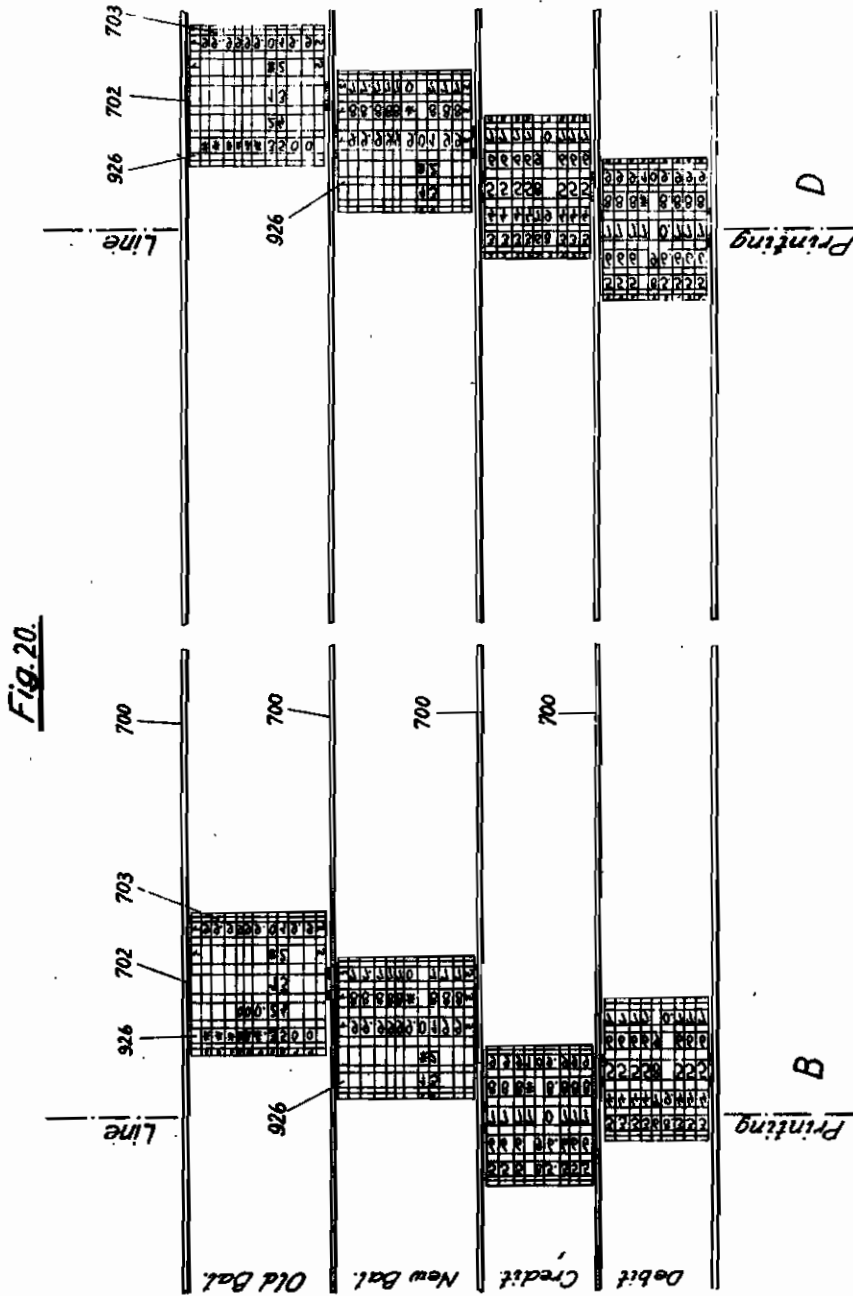
PRINTING MECHANISM FOR BOOKKEEPING MACHINES

226,467

BY A. P. C

Filed Aug. 24, 1938

27 Sheets—Sheet 19



KURT AURBACH  
INVENTOR

BY *Knight Bro*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

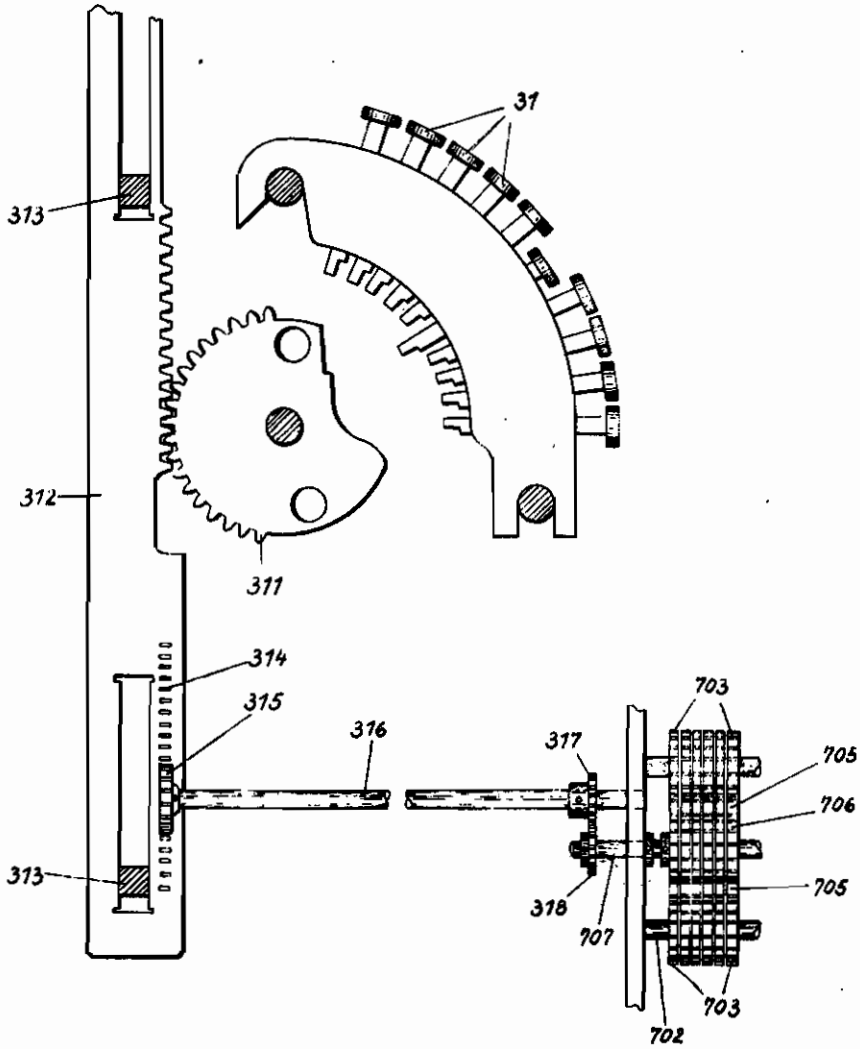
226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 20

Fig. 21.



KURT AURBACH  
INVENTOR

BY *Knight Bro*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

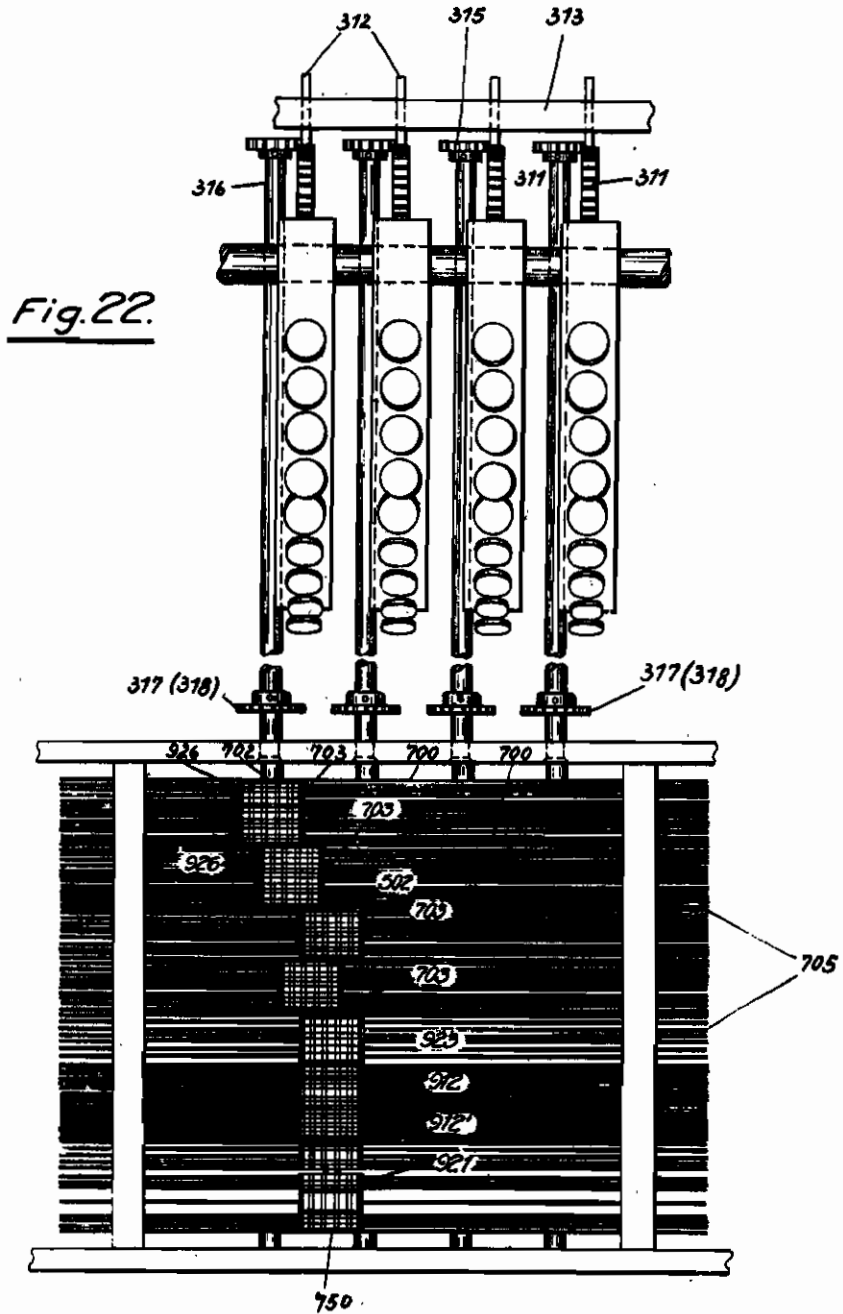
MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES 226,467

BY A. P. C.

Filed Aug. 24, 1936

27 Sheets-Sheet 21



KURT AURBACH  
INVENTOR

BY *Haight Bros*

ATTORNEYS

PUBLISHED

K. AURBACH

Serial No.

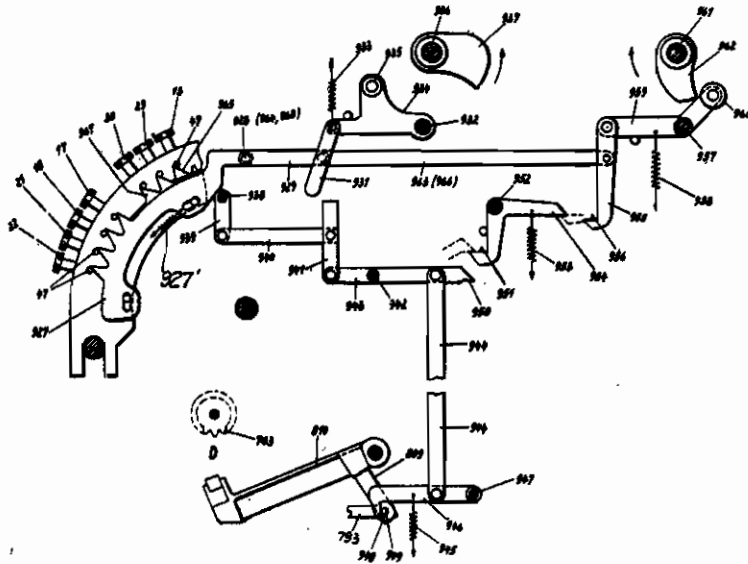
MAY 4, 1943. PRINTING MECHANISMS FOR BOOKKEEPING MACHINES 226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets—Sheet 22

Fig. 23.



KURT AURBACH  
INVENTOR

BY *Knight Bros*

ATTORNEYS.

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

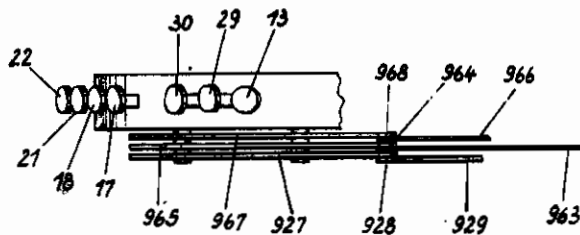
226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 23

Fig. 24



KURT AURBACH  
INVENTOR

BY *Knight*

ATTORNEYS.

Fig.25.

<i>Printing Diagram</i>					
<i>Kind of Operation Setting Keys</i>	<i>Printing Place</i>				
	<i>Books</i>	<i>Account Card</i>	<i>Receipt Card</i>	<i>Contra % Card</i>	<i>Control Strip.</i>
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>
<i>Old and New Balance I</i> <small>ACI; ADI; DACI; KEY 12 KEY 16 KEY 18 DADI; NCI; NDI KEY 20 KEY 14 KEY 18</small>	<i>Print</i>	<i>Print</i>	<i>Print</i>	<i>No Print</i>	<i>Print</i>
<i>Debits 1-22</i> <i>Credits 1-22</i>	<i>Print</i>	<i>Print</i>	<i>Print</i>	<i>No Print</i>	<i>Print</i>
<i>End - Total</i> <small>KEY 30</small> <i>Sub - Total</i> <small>KEY 29</small>	<i>No Print</i>	<i>No Print</i>	<i>No Print</i>	<i>Print</i>	<i>Print</i>

Fig.26.

<i>Printing Diagram</i>					
<i>Kind of Operation Setting Keys</i>	<i>Printing Place</i>				
	<i>Books</i>	<i>Account Card</i>	<i>Receipt Card</i>	<i>Contra % Card</i>	<i>Control Card</i>
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>
<i>Old and New Balance I</i> <small>ACI; ADI; DACI; KEY 12 KEY 16 KEY 18 DADI; NCI; NDI KEY 20 KEY 14 KEY 18</small>	<i>Print</i>	<i>Print</i>	<i>Print</i>	<i>No Print</i>	<i>Print</i>
<i>Old and New Balance II</i> <small>ACII; ADII; DACII; DADII; NCII; NDII;</small>	<i>No Print</i>	<i>No Print</i>	<i>No Print</i>	<i>Print</i>	<i>Print</i>
<i>Debits 1-22</i> <i>Credits 1-22</i>	<i>Print</i>	<i>Print</i>	<i>Print</i>	<i>Print</i>	<i>Print</i>
<i>End - Total</i> <small>KEY 30</small> <i>Sub - Total</i> <small>KEY 29</small>	<i>No Print</i>	<i>No Print</i>	<i>No Print</i>	<i>Print</i>	<i>Print</i>

KURT AURBACH  
INVENTOR

BY *Knight Bros*  
ATTORNEYS.



PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 25

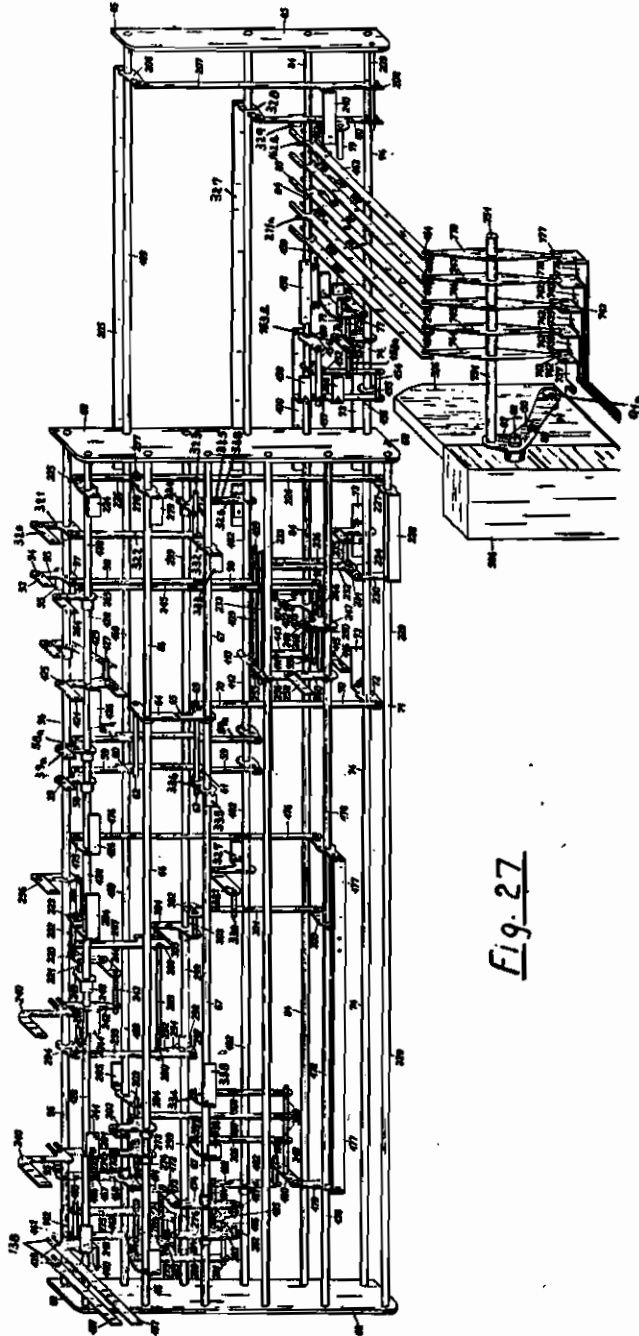


Fig. 27

Kurt Aurbach  
inventor  
By Knight Bros  
his attorneys

PUBLISHED

K. AURBACH

Serial No.

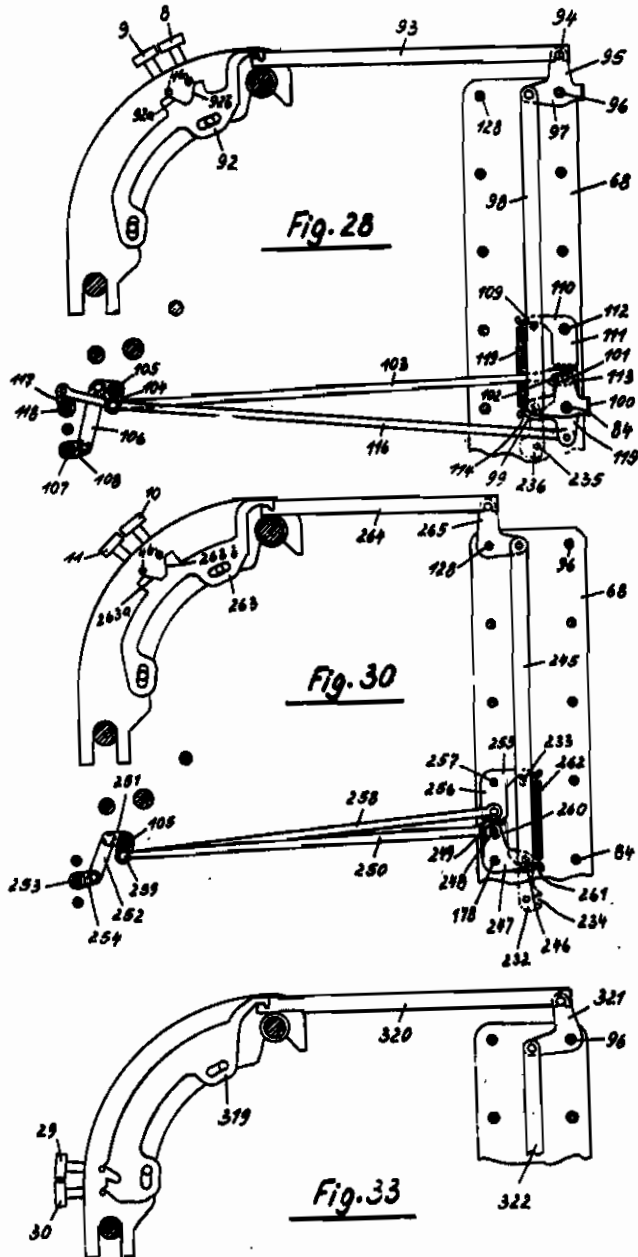
MAY 4, 1943.

PRINTING MECHANISMS FOR BOOKKEEPING MACHINES 226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets—Sheet 26



Kurt Aurbach  
Inventor  
By Knight Bros  
His Attorneys

PUBLISHED

K. AURBACH

Serial No.

MAY 4, 1943. PRINTING MECHANISMS FOR BOOKKEEPING MACHINES 226,467

BY A. P. C.

Filed Aug. 24, 1938

27 Sheets-Sheet 27

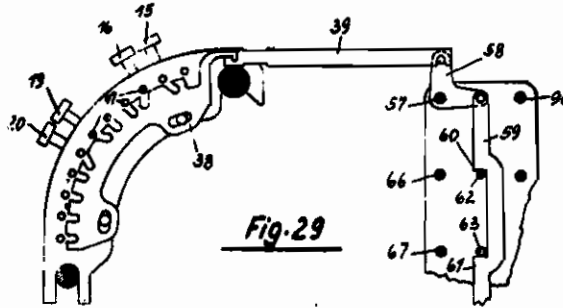


Fig. 29

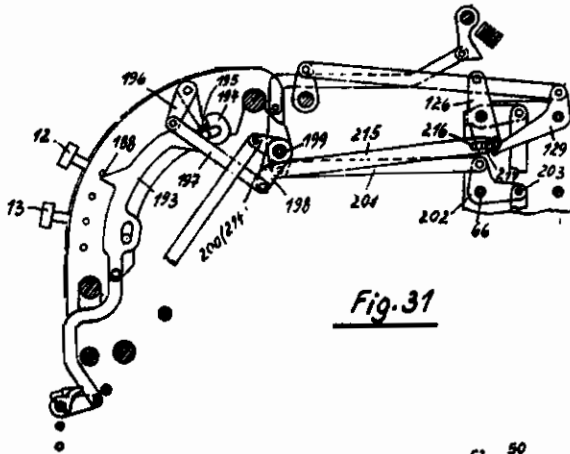


Fig. 31

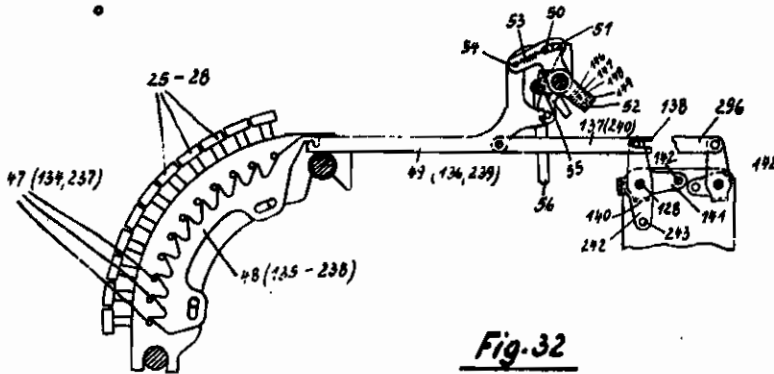


Fig. 32

Kurt Aurbach  
Inventor  
By *Thompson*  
His Attorney

# ALIEN PROPERTY CUSTODIAN

## PRINTING MECHANISMS FOR BOOKKEEPING MACHINES

Kurt Aurbaeh, Bielefeld, Germany; vested in the  
Alien Property Custodian

Application filed August 24, 1938

The invention relates to a printing mechanism for bookkeeping machines having two balance mechanisms.

The posting of a series of entries consisting of the old balance of an account and a contra-account, the debits and credits, and the new balance of an account and a contra-account has previously been carried out by first posting the old balance, the debits and credits, and the new balance of the account and thereupon the old balance, the debits and credits and the new balance of the contra-account at one and the same printing place.

The primary object of the present invention is to consolidate and reduce in number, as far as possible, the machine operations for posting an account and a contra-account, by carrying out the posting of the debits and credits for the account and for the contra-account in a single machine operation. In accordance with the invention the debits and credits are entered in separate columns on both the record sheets for the account and the contra-account, but in reverse arrangement; that is to say, items entered as credits on the account record sheet are entered in the debits column of the contra-account record sheet.

A further feature of the invention is that the printing place for the contra-account is rendered inoperative in posting a series of entries relating only to the old balance, one or more debits and credits, and the new balance of a single account, whereas in posting a series of entries relating to an account and a contra-account and consisting of the old balance of the account and the contra-account, one or more debits and credits, and the new balance of the account and the contra-account, the printing place for the contra-account is rendered operative.

A further feature of the invention is the provision of means for indicating which of a plurality of printing places are operating during a given machine operation.

Other improvements relate to the drive of the printing hammers.

One illustrative embodiment of the invention is shown in the accompanying drawing, which shows particularly the printing mechanism of a bookkeeping machine, other parts of this machine being described in my copending application Serial No. 226,468 (F-20311).

Fig. 1 is a perspective view of the entire machine;

Fig. 1a is a diagram of the setting field of the machine;

Figs. 2 and 2a are parts of one vertical section of the printing mechanism parallel to the face of the machine.

Fig. 2b is a detail sectional view of the spring driving mechanism for one of the printing hammers;

Figs. 3 and 3a are parts of a plan view of the printing mechanism, with portions broken away;

Fig. 4 is a plan view of a portion of the mechanism for controlling the special sign type wheel frame;

Fig. 5 is an elevation of the printing mechanism from the right side, with parts in section and parts omitted;

Fig. 6 is a vertical section of a portion of the slide mechanism controlling the special sign printing mechanism, taken on the line 6-6 of Fig. 2;

Fig. 7 is a horizontal section of another portion of the mechanism controlling the special sign printing mechanism, taken on the line 7-7 of Fig. 2;

Fig. 8 is a vertical section of a portion of the feeler mechanism, on the line 8-8 of Fig. 2;

Fig. 9 is a horizontal section of a detail of the printing hammer control, on the line 9-9 of Fig. 2;

Figs. 10-13 are side elevations of several slides constituting a part of the mechanism controlling the special sign printing mechanism;

Fig. 14 is an upwardly directed view of a horizontal section through a portion of the same slides, on the line 14-14 of Fig. 2;

Fig. 15 is a horizontal section of a portion of the printing mechanism showing a feeler and a portion of a record sheet holder in plan view;

Figs. 16 and 16a are respectively a side elevation and edge view of a slide forming part of the feeler mechanism;

Fig. 17 is a side elevation of one end of a rail forming part of the mechanism controlling the special sign printing mechanism;

Figs. 18 and 19 respectively show the upper portions of an account card and a contra-account card;

Fig. 20 is a plan view of a portion of an amount printing wheel frame;

Fig. 21 is a vertical section through the setting mechanism showing in side elevation a bank of amount keys and parts of a differential mechanism controlled thereby;

Fig. 22 is a partial plan view of the machine with casing removed showing the amount setting mechanism and printing mechanism controlled thereby;

Fig. 23 is a somewhat diagrammatic vertical section of a portion of the setting mechanism showing in side elevation several special setting keys taken from different parts of the keyboard and consolidated in one bank in this view, to show the blocking mechanism controlled by them;

Fig. 24 is a fragmentary plan view of the key bank as shown in Fig. 23;

Figs. 25 and 26 are two diagrams showing the sequence of operations of the printing mechanisms;

Fig. 27 is a laterally expanded perspective view of the mechanism interconnecting the special keyboard and the printing mechanism;

Fig. 28 is a vertical section of a portion of the special keyboard showing mechanism controlling the engagement of one of the balance mechanisms;

Fig. 29 is a vertical section of a portion of the special keyboard;

Fig. 30 is a vertical section of a portion of the special keyboard showing adjusting mechanism for one of the balance mechanisms;

Fig. 31 is a vertical section of a portion of the special keyboard;

Fig. 32 is a vertical section of a portion of the special keyboard;

Fig. 33 is a side elevation of the keys for sub-total and grand-total with the appurtenant slide.

The bookkeeping machine shown has two balance mechanisms, I and II, for keeping an account and a contra-account, respectively. There are five printing places (Figs. 2 and 2a), one at B for the account card, one at D for the contra-account card, one at A for the account book, one at C for the receipt, and one at E for the control strip.

The printing mechanism for the amounts is carried by two frames, one for the upper printing places and the other for the lower ones. Each frame is composed of longitudinal bars 700 (Figs. 2, 2a, 3, 3a, and 20) and struts 701. The type wheels 703 are rotatably mounted on shafts 702 extending between the side bars 700. The type wheel frames are guided by their longitudinal bars 700 upon transverse bearing plates 704. There are five different assemblies of amount type wheels, corresponding to the five printing places. Each assembly is composed of four sets of type wheels mounted in a staggered arrangement, as shown in Fig. 20. The entire frame can be moved longitudinally of the bars 700, in order to bring a selected one of the several sets of printing wheels up to the printing line at each printing place.

The differential setting of the type wheels is performed by rack bars 705 driven by toothed wheels 706 (Figs. 2a and 21). The toothed wheels 706 are non-rotatably mounted upon longitudinally grooved shafts 707. Their setting is controlled by the setting keys 31 (Figs. 1 and 21) for the amounts. The keys 31 operate for this purpose upon a differential mechanism comprising differential gears 311 meshing with rack bars 312 guided for vertical movement by rectangular bars 313 and having at their lower ends punched holes 314 meshing with pinions 315. The mechanism for stopping the differential gears 311 by the depressed keys is not shown in the drawing, since it forms no part of the invention. The gears 311 are rotated in the conventional manner in each machine operation in which an amount is entered, until stopped by the depressed amount keys 31. Each pinion 315 is pinned rigidly to a

shaft 316, which has fixed to its other end a toothed wheel 317. With the toothed wheel 317 meshes a toothed wheel 318 rigidly fastened upon a shaft 707, which has fixed to it a pinion 706 for each of the four sets of printing wheels of which each assembly is composed. Each driving wheel 706 stands in engagement with two rack bars 705 above and below, which are in mesh at their opposite sides with the type wheels 703 rotatably mounted upon shafts 702. There is an upper set of rack bars 705 for the printing wheels of assemblies A, E and C and a lower set of rack bars for the printing wheel assemblies B and D. In the present case since the assemblies are composed of four sets of printing wheels, with nine wheels in each set, there are required nine shafts 707, each with four transmission wheels 706, and nine rows of keys for the respective shafts 707. The drawing shows only a part of the full complement of these wheels and shafts. Setting levers might be used in place of key banks to set the shafts 707.

The type wheel frames for the amounts are displaced, in order to bring the sets of printing wheels into printing position, by a rack bar 708 adjacent the inner casing wall 506 (Fig. 3), which meshes with a toothed wheel 709. The toothed wheel 709 is fixed upon a shaft 710 (Figs. 2 and 3), which is rotatably mounted in the casing walls 506, and has secured to it pinions 711 meshing with teeth 712 of longitudinal bars 700. The rack bar 708 is extended downward at its right end (Fig. 2) in the form of a plate 713 provided with a series of teeth 714, which mesh with a pinion 716 pinned upon a shaft 715. Upon shaft 715 there is also fixed a coupling disk 717 provided with a hub 720. The coupling disk 717 holds a series of coupling pins 719 which are under the influence of compression springs 718. The hub 720 of coupling disk 717 connects the disk rigidly to a guide disk 721 in which the other ends of pins 719 are guided. To each coupling pin 719 is rigidly connected a fork-shaped projection 722, the projections 722 being respectively controlled by a series of forks 723 operated by special setting keys 8, 9, 10, 11, 15—22, 12, 13 (Figs. 1 and 1a) through mechanism to be referred to presently. These special setting keys serve, for instance, for setting the machine for printing the old balance, the debits, the credits, and the new balance. In any one machine operation one, and only one, of the pins 719 is projected beyond the plate 721 for engagement by a tong-like driver mechanism. This latter mechanism comprises two jaws 725, and 727 mounted respectively upon two nested sleeves 725a and 727a. The inner sleeve 725a is revolvably mounted upon shaft 715. The sleeve 727a bears a gear 726 and the sleeve 725a bears a gear 724. These gears mesh, respectively, with two rack bars 728 and 729 mounted upon the two forks of a slide 730. The slide 730 is guided at its forked end upon sleeve 725a and has a slot 730a by which it is guided upon a hub of a cam disk 733, fixed to shaft 734. The slide 730 has mounted upon it rollers 731 and 732 which bear upon the cam disk 733. The shaft 734 to which the cam disk is fixed is driven through two bevel gears 735 and 736 from the driving mechanism of the machine (not shown). The cam disk 733 reciprocates the slide 730, which, on its movement to the right (Fig. 2) rocks the jaw 725 counterclockwise and the jaw 727 clockwise, thus moving that one of the pins 719 which has been projected forward by a fork 723 to the position of

the pin numbered 719 in Fig. 2. The resulting rotation of the shaft 715 is transmitted through gear 718 and rack plate 714 to rack bar 708, thence through gear 709, shaft 710 and gears 711 to the rack bars 700. These rack bars serve to position the amount type wheel frame, the type wheels 703 rolling upon the rack bars 705 until the selected set of type wheels has reached the printing line. During this time, by the action of shafts 707, pinions 706, and rack bars 705 the type wheels 703 have been set by the differential mechanism, so that now the imprint of the amount thus set up, in the corresponding column of the record sheet, can follow.

It has been stated that the operation of the forks 723 which control the positioning of the amount totalizer wheel frame is determined by the special setting keys 8—11, 15—22, 12—13. For this purpose there is provided a series of slides 737—740 (Figs. 2, 3 and 5) to each of which one of the forks 723 is fixed. These slides are guided upon pins 741 and have bent-up flaps 742 notched at 743. Into the notches 743 project levers 744—747 rockably mounted upon a pin 751. This pin is fixed to an arm 87 of a bell crank lever rockably mounted upon a pin 88 secured upon the casing wall 506. The other arm of this bell crank lever bears a pin 89 engaging the forked end 90 of a lever 91 fixed upon a rock shaft 91a, which has a clockwise and counterclockwise movement in each machine operation. The upper ends of the levers 744—747 engage in notches 86, 161, 164, 213, 269 of rails 82, 160, 163, 212, 268, which are normally free to slide, but which can be individually blocked by a suitable mechanism controlled by the keys 8—11, 15—22, 12—13, as will presently be described. In any machine operation, when the lever 91 rocks clockwise the bell crank lever 87 rocks counterclockwise and all but one of the levers 744—747 rock about their lower ends, pulling the slides at their upper ends to the left. That one of the levers 744—747 whose upper slide has been blocked rocks about its upper end and moves that one of the slides 737—740 which is connected to its lower end to the left, thus thrusting forward the corresponding pin 719 in the manner previously described.

The slide 82 controls the setting of the amount type wheel frames in position to print in the old balance column. This slide is blocked by the operation of any one of the keys 15—22. For this purpose there is arranged beside this bank of keys a slide 38 (Fig. 29) mounted so as to move in either clockwise or counterclockwise direction upon depression of one of the keys 15, 18 or 19, 20. There is connected to the slide 38 a thrust bar 39, the opposite end of which acts upon a bell crank lever 58 rockably mounted upon a shaft 57 supported in the frame of the machine. To this bell crank lever is connected a bar 59 having two shoulders 60 and 61, which cooperate with two pins 82 and 63 fixed respectively to two toothed levers 64 and 65 (Fig. 27). A thrust bar 39a (Fig. 27) is similarly controlled by keys 17, 18, 21 and 22 and acts in the same way through a bell crank lever 58a and a shouldered bar 59a upon the pins 62 and 63. The toothed levers 64 and 65 are rockably mounted respectively upon shafts 66 and 67. To the lever 65 is connected, by a pin 69, a link 70, whose lower end is connected at 71 to the arm 72 of a bridge lever 73. The bridge lever 73 is rockably supported upon a shaft 74 and extends beyond the right hand side wall 68, where it is provided with an arm 74a attached to a pin

75. The pin 75 is connected to a link 76, whose other end is articulated to an arm 77 of a bell crank lever 78. The bell crank lever 78, is rockably supported on a pin 79 secured to a thrust bar 80. A bent-over end 78a of bell crank lever 78 coacts with a finger 81 of the bar 82 to block it.

In posting debits and credits to the account and the contra-account, it is necessary that items credited to the account be debited from the contra-account, and vice versa. For this reason the sets of printing wheels printing in the debit and credit columns of the account record sheet are stepped in reverse direction to the sets of printing wheels printing in the debit and credit columns of the contra-account record sheet (see Fig. 20). As indicated by the designated printing lines in this figure, the type wheel frame is in position to print in the credits column of the account and in the debits column of the contra-account.

The positioning of the amount type wheel frames to print in the debits column of the account is determined by blocking the slide 160, and its positioning to print in the credits column of the account is determined by blocking the slide 268. The mechanism for blocking these slides is controlled by the releasing keys 0 and 9. Beside the keys 8 and 9 (Fig. 28) is a slide 92 provided with cam faces 92a and 92b to be engaged respectively by pins 46 of the keys 8 and 9. By these cam faces the slide is moved either clockwise or counterclockwise. A bar 93 connected to the slide 92 is articulated at 94 to a bridge lever 95 rockably mounted on a shaft 96. An arm 97 of the bridge lever is connected to a link 98, whose lower end is articulated by a pin 99 to a bridge lever 100 rockably mounted on a shaft 84. The bridge lever 100 extends beyond the right-hand side wall 68 (Fig. 27), where it is provided with an arm 150 bearing a pin 151. The pin 151 projects into a slot 152 of a pawl 153, which is rockably mounted upon a pin 154. The pin 154 is fixed to a lever 155 rockably supported on shaft 74. Upon pin 154 there is also provided a thrust bar 156 having a slot 157 which embraces the pin 151. The thrust bar 156 has a bent-over arm 158 which coacts with a finger 159 to block the bar 160, and a second bent-over arm 266 which coacts with a finger 267 to block the bar 268; thus, the bar 160 will be blocked by depression of the key 9 and the bar 268 will be blocked by depression of the key 8.

The positioning of the amount type wheel frame to print in the new balance column is determined by the blocking of slide 212. The mechanism for blocking this slide is controlled by the key 12. For this purpose there is mounted beside the key 12 (Fig. 31) a slide 193, which is moved counterclockwise by the pin 188 of key 12. The upper end 194 of this slide bears against an arm 195 of a bell crank lever whose other arm is connected by a link 197 to an arm 198 fixed to shaft 199. A second arm 200 fixed to this shaft is connected by a link 201 to a bell crank lever 202 rockably mounted on a shaft 66. A pin 203 fixed to lever 202 (Fig. 27) projects into a fork 204 of a bridge lever 205. This bridge lever is rockably mounted upon a shaft 169 and extends to the extreme right end of Fig. 27, where its arm 206 is connected to a thrust bar 287 guided by fork 208 upon pin 209. A lateral arm 210 of thrust bar 207 coacts with a finger 211 to block slide 212.

The keys 8—11 also have the function of setting the machine to engage one or the other of

the balance mechanisms for positive or negative operation by the differential mechanism. For the purpose of determining the positive or negative operation of the balance mechanism I, the bridge lever 100 (Fig. 29) has fixed to it a pin 101 which engages in a slot 102 of a rod 103. The rod 103 is connected to a bell crank lever 104, which is loosely rockable upon a shaft 105. To the other arm of the lever 104 is connected a link 106, which is articulated at its opposite end to a lever 108 secured to a shaft 107. This shaft serves for lateral displacement of the balance mechanism I, according to whether it is to be operated for positive or negative registration of an amount.

The adjusting mechanism for the balance mechanism is described in my pending application Serial No. ——— (F-20 311).

The machine is set to engage the balance mechanism I by the following linkage. Upon the bar 98 is fixed a pin 109 adapted to act upon an arm 110 of a toothed sector 111. The toothed sector 111 is supported upon a rod 112 and meshes with a toothed sector 113 rockably mounted upon rod 84. An arm 114 of toothed sector 113 stands in contact with the pin 99. The two arms 110 and 114 of toothed sectors 111 and 113 are connected by a spring 119, which pulls them into contact, respectively, with pins 109 and 99. A second arm 115 of toothed sector 113 carries a rod 116 which is coupled to a lever 117 secured to a shaft 118. This shaft serves for setting the machine to engage the balance mechanism I with the differential mechanism.

The coupling mechanism for the balance mechanism is described in my pending application Serial No. ——— (F-20 311).

Similar mechanisms are provided for determining the positive or negative operation of the balance mechanism II and for setting the machine to engage this balance mechanism. For this purpose there is provided a second slide 263 having cam faces 263a and 263b (Fig. 30) coacting with the pins 46 of the keys 10 and 11. The slide 263 is connected by a bar 264 to a bell crank lever 265 rockably mounted on shaft 128. A link 245 on the other arm of this bell crank lever is connected by a pin 246 to a bell crank lever 247 rockably mounted upon the shaft 178. A pin 248 on the bell crank lever 247 engages in a slot 249 of a link 250. The left-hand end of this link 250 is connected to a bell crank lever 251 rockably mounted upon the shaft 105. The other arm of the bell crank lever 251 is connected by a link 252 to an arm 254 fixed to a shaft 253 which serves for selection of the proper side (plus or minus) of the balance mechanism II. This selection is made through mechanism similar to that previously described for the balance mechanism I. The pin 246 which connects bar 245 to bell crank lever 247 extends over an arm 261 of a toothed sector 260 rockably mounted on shaft 178. The teeth of sector 260 are in mesh with a toothed sector 256 rockably mounted upon a rod 257. The sector 256 is connected by a link 258 to an arm 259 rigidly fastened on shaft 105. This shaft sets the machine to engage the balance mechanism II with the differential mechanism in a manner similar to that previously described with reference to the balance mechanism I. The sector 256 has a rearwardly extending arm 255 connected by a spring 262 to the arm 261 of sector 260. The arm 265 is held by the spring against a pin 233 fixed to the bar 245. Movement of the bar either up or down will set the machine to engage the balance mechanism II with the differential

mechanism, through the link 258. Downward movement of the bar 245 will select the addition side of the balance mechanism II, by pulling rod 250 to the right, while upward movement of the bar 245 will simply cause the pin 248 to move to the left in slot 249, leaving the balance mechanism II in position for engagement of the subtraction side.

In posting debits and credits to the account and the contra-account simultaneously, the balance mechanisms are simultaneously engaged with the differential mechanism, but for reverse operation. In these operations the machine is released by one of the keys 8 or 9, which normally control the engagement of the balance mechanism I. Joint engagement of the two balance mechanisms under the control of the keys 8 or 9 is provided for by a mechanism controlled by the depression of a key in the banks 1 or 2 and a key in the banks 3 or 4. This mechanism will now be described. There is suspended from the pin 109 on bar 98 a link 236, at the lower end of which is a pin 235. The pin 233 on bar 245 has suspended from it a latch 232 whose lower forked end 234 stands opposite the pin 235. This latch is connected by a link 231 to an arm 230 of a bridge lever 228 rockably mounted upon a rod 229. The other arm 227 of the bridge lever is connected to a bar 226, the upper end of which is articulated to an arm 225 of a bridge lever 224. The bridge lever 224 is rockably mounted on shaft 128 and has at its left end an arm 223 connected to a pin 222. The pin 222 is fixed to one arm of a bell crank lever 220 rockably mounted upon a pin 221. The pin 221 is fixed to an arm 219 of a bridge lever 218 rockably mounted on shaft 128. The bridge lever 218 is integral with a bridge lever 140, having two arms each bearing a pin 139 engaged by the forked end 138 of a bar 137. The two bars 137 are connected by two bars 136 to two slides 135 mounted respectively beside the two key banks 1 and 2. The depression of any key in the banks 1 or 2 will cause its pin 134 to cam the appurtenant slide 135 in clockwise direction, thus rocking the bridge levers 140 and 218 in the same direction and lowering the pin 222. This movement of the pin 222 causes the latch 232 to approach, but not to engage the pin 235. The additional movement required for this purpose is derived from the depression of a key in the banks 3 or 4. For this purpose the downwardly extending arm of bell crank lever 220 is connected by a link 244 with a pin 243 fixed to an arm 242 of a bridge lever 241 rockably mounted on shaft 128. The upwardly extending arms of bridge lever 241 are respectively engaged by the forked ends of bars 240, which are connected by bars 239 to slides 238 respectively positioned beside the key banks 3 and 4. Depression of any one of the keys in these two banks will cause its pin 237 to cam in clockwise direction the appurtenant slide 238, thus rocking the bridge lever 241 in clockwise direction and lowering the pin 222 by a further amount sufficient to cause the engagement of latch 232 with pin 235. With the latch in this position the mechanism for selecting the positive or negative side of the balance mechanism II and for setting the machine to engage the balance mechanism II will be operated jointly with the corresponding mechanisms controlling the balance mechanism I.

#### *Special sign printing mechanism*

The printing mechanism for the special sign (account number, contra-account number, clas-

sification, check number, date of transaction, etc.) consists of two frames formed of longitudinal bars 748 (Figs. 2, 3 and 5) and struts 749, in which frames the type wheels are rotatably mounted upon shafts 750. The type wheel frames are guided by their longitudinal bars 746 on the same transverse bearing plates 704 which guide the longitudinal bars 790. The setting of the type wheels is performed by rack bars 752 driven by toothed wheels 753. The toothed wheels 753 are non-rotatably mounted upon longitudinally grooved shafts 754, the angular position of which is set by differential mechanism similar to the amount differential mechanism, controlled by the setting keys 25—28, 8—11, 14—24, 29—30, 12—13, 33—37 (Figs. 1 and 1a).

The type wheel frames for the special signs are displaced by a rack bar 755 adjacent the inner casing wall 596 in Fig. 3, which meshes with a toothed wheel 756. The toothed wheel 756 is rigidly fastened upon a shaft 757 (Figs. 2 and 3) which bears toothed wheels 758 engaging series of teeth 759 on longitudinal bars 748. The shaft 757 is rotatably mounted in the casing walls 506. The rack bar 755 bears a pin 760, which engages in the fork 761 of a lever 763 rockably mounted upon a shaft 762. The lever 763 is formed with a toothed segment 764, the teeth of which mesh with a toothed wheel 765. The toothed wheel 765 is rigidly connected to a hub 766 which bears a coupling disk 767 and a guiding disk 768. These disks hold pins 770, which stand under the influence of springs 769 tending to move them toward the rear. The pins 770 are grooved at 771 (Fig. 4) and in these grooves engage the ends of a lever 772 which is rockably mounted upon a pin 773 riveted to the hub 766.

With one of the pins 770 is rigidly connected a fork-shaped arm 774, which is controlled by the special setting keys 25—28 for the debit and credit postings, or 8—11 and 29, 30 for taking a sub-total or end-total from the totalizers for the old balances, for the debits and credits, for the cancellations and corrective entries, and for the total debits and credits. With the pins 770 cooperates a tong-like driver, which receives its drive in the same manner as the one for the amount printing mechanism already described. The parts of this device are therefore given the same numbers with an index. The fork 775 is formed from a bent-over part of the slide 776 (Figs. 2, 3 and 5), which is guided upon the pins 741 and has a bent-up flap 777 with a notch 778. In the notch 778 engages a lever 779, which is also rockably mounted upon the pin 751. The other end of the lever 779 engages in a notch 164 of a bar 163 (Fig. 27). The bar 163 is blocked by the same mechanism which blocks the bars 160 and 268. For this purpose the arms 158 and 266 extend across to the bar 163 and coact, respectively, with fingers 162 and 162a.

For each of the keys 8—28 there is a totalizer.

The adjusting and coupling mechanisms for the totalizers are described in my copending application Serial No. ———, (F-20 311).

Keys 29 and 30 are provided to set the machine for taking sub-totals and end-totals, respectively, from the totalizers. The total taking mechanism for the totalizers is described in the USA Patent 2,029,776.

The keys 29 and 30 position the amount type wheel frames to print in the new balance columns. For this purpose mechanism is provided to block the slide 212 under the control of the keys 29 and 30. A slide 319 (Fig. 33) is mounted

beside the keys 29 and 30 and is connected to a bar 320 (Fig. 27). This bar is articulated to a bell crank lever 321 rockably mounted on shaft 96. The other arm of the bell crank lever is connected to a link 322 provided with a pin 323. This pin engages one forked arm of a bell crank lever 324 rockably mounted upon a shaft 299. The downwardly extending arm of this bell crank lever has a fork engaging a pin 325 on a bell crank lever 326 rockably mounted on shaft 182. The bell crank lever 326 is secured to a bridge lever 327 bearing at its right end an arm 328 rockably mounted on shaft 182. The arm 328 is connected to thrust bar 80. This thrust bar has an arm 329 adapted to engage a finger 211a on slide 212 to block the slide. The arm 329 also coacts with a finger 162b to block slide 163, which causes the special sign type wheel frame to be thrown into printing position.

The mechanism just described therefore accomplishes the movement into printing position of the type wheel frame for the special signs, on postings of debits and credits—particularly postings to the account and the contra-account—and on the drawing of a sub-total or end-total from the totalizers for the old balances, for the debits and credits, for the cancellations and corrective entries, and for the total debits and credits.

The posting date is printed by a set of type wheels 977 (Fig. 3). These are set by rack bars 752a extending sufficiently far to the right to mesh with a set of pinions 978 respectively fixed to a set of telescoping tubes 979 and a shaft 980. The tubes and the shaft have respectively fixed to them knurled wheels 981 by which they can be rotated to set the date type wheels.

The special sign type wheels 921 (Figs. 3, 3a and 5) for the date of the transaction (Figs. 18 and 19) in the assembly of special totalizer wheels present in printing position, in their normal setting, in which no transaction date is set, a type representing an arrow 922. This arrow has the purpose of indicating that the transaction date is the same as the posting date, for instance where interest begins to run from the day upon which the entry is printed on the record sheet. The operator of the machine therefore does not have to set the date of the transaction in the setting field of the machine in this case, but this would be necessary if the interest should be computed from a date prior to the date of posting upon the account card of the owner of the account, particularly in the case of transfers. When the date of the transaction is different from the posting date it is set by keys 37 through differential mechanism similar to the amount differential mechanism.

There are also provided type wheels 923 (Figs. 3, 3a and 5) in the assembly of special type wheels, whose type 924 (Figs. 18 and 19) leave an impression upon the record sheets which indicates that the balance mechanism I has been operated either positively or negatively. The arrow 924 pointing to the left in line 2 of the record sheets mean that in this posting the balance mechanism I has taken up a debit—(minus) amount—whereas the arrow 924 pointing to the right in line 3 of the record sheet indicates that in this posting operation a credit—(plus) amount—has been entered in the balance mechanism I. Whereas the double arrow indicates entries consisting of the old balance of an account and a contra-account, the debits and credits, and the new balance of an account and



a contra-account; simple arrows indicate a posting consisting simply of the old balance, the debits and credits, and the new balance of an account.

The type wheels 926 (Figs. 3, 3a and 5) in the amount type wheel sets 703 are provided with type (1, 2, Figs. 18 and 19), which indicate from which balance mechanism (I, II) the old balance was taken or from which balance mechanism the new balance was drawn.

The type wheels 923 set by the key 25—28 through differential mechanism similar to the amount differential mechanism.

The other type wheels in the group of special type wheels include those for printing the account number, the contra-account number, a serial number, the number of the machine, the classification of the debit or credit item, and its identification number. These type members are set by the setting keys 33—36, with the exception of the serial number type wheels and the machine number. The latter is fixed, while the serial number type wheels are set by a special mechanism operated by the driving mechanism of the machine in a manner well understood and therefore not particularly described.

#### *Printing hammer drive*

There is a set of printing hammers 810A—810E, each being rockably mounted for coaction with one of the assemblies of printing wheels. Each printing hammer extends across the entire assembly of type wheels, including the amount type wheels and the special sign type wheels of each printing place; therefore the springs which operate the printing hammers must be made correspondingly strong, in order to produce perfect impressions upon the record sheets. Since, as already described, for certain entries (old balance, new balance) no special signs are printed upon the record sheets, but only amounts, a less forceful stroke of the printing hammers is sufficient to make a perfect impression upon the record sheets for these entries. Accordingly, means are provided to reduce the force of the printing hammers at certain operations. The printing hammer actuating mechanism and the means for reducing the force thereof at certain operations will now be described:—

The power which drives the printing hammers is derived from a series of pairs of springs 791, 791a (Figs. 2a, 2b, and 3a). The springs 791 are mounted upon bushings 792 and backed against a bearing plate 794 fixed by screws to a cross beam 787, which is screwed to the casing walls 506. The left ends of springs 791 bear against collars 790 loosely mounted upon bushings 792. Upon the opposite side of collars 790 are the springs 791a, which are mounted upon tubes 796. Within each bushing 792 is a thrust rod 793, the left end of each thrust rod being provided with a connecting member 798 attached by a pin 799 to a lever 801. The connecting member 798 has a shoulder 797 against which bears the left end of the spring 791a. The levers 801 are rockably supported upon a shaft 800 and bear rollers 802 which ride upon cams 803 fixed to a shaft 804. The cam disks 803 have steps 805 to release a stroke to the left of the rods 793, under the influence of the springs 791, 791a. The rods 793 which operate the lower printing hammers 810B and 810D are connected by pins 806 to the downwardly extending arms 809 of these printing hammers. The rods 793 which operate the upper printing hammers 810A, 810C and 810E are connected by pins 806 to bell crank levers 808 rockably supported

on shafts 807. The upper arms of these bell crank levers are connected by links 811 to the respective printing hammers.

In machine operations in which the special sign type wheels are effective in addition to the amount type wheels, the combined force of the springs 791 and 791a is exerted upon the printing hammers. In machine operations in which only the amount type wheels print, the springs 791a act alone upon the printing hammers. For this purpose there is provided a plate 786 mounted by a hinge 786 upon the cross beam 787 and provided with a lip 789 adapted to engage behind the collars 790. An arm 785 on hinge 786 is connected by a pin 784 to a link 783, the right-hand end of which is attached by a pin 782 to the rack bar 755. This is the rack bar which moves the special sign type wheel frame into and out of printing position. The connections are such as to cause the plate 786 to block the collars 790 when the special sign type wheel frame is moved out of printing position.

Upon the shaft 807B there is mounted a bell crank lever 812, to which is connected a pitman 813. The pitman 813 has a fork 814 into which projects a roller 815 of a fork lever 817 rockably mounted upon a pin 818. In the fork of lever 817 engages a roller 818 of a lower parallel linkage 820, whose connecting members 821 cooperate with notches 822 of lower rack bars 705, 752 and with notches of the lower longitudinal bars 700, 748. To the upper parallel linkage 820 the pitman 813 is directly connected. A link 824 (Figs. 2a and 3a) is connected to lever 812 by means of a pin 823, the other end of the link 824 being connected to a lever 825 (Fig. 3a) rotatably mounted upon the shaft 800. The lever 825 has mounted upon it two rollers 826 and 827 which cooperate respectively with cam disks 828 and 828 pinned to the shaft 804. The effect of the engagement of the bars 821 with the notches 822 is to hold the rack bars 705, 752 and the longitudinal bars 700, 748, and thereby the amount type wheel frames and the special sign type wheel frames, after they have been set to a certain position.

The printing mechanism according to the present invention has further a device for indicating upon the inserted record sheets or the control strip during a posting operation those printing places at which an impression was taken or a record sheet inserted. This refers particularly to the cooperation of the printing places A, B, C, D, where the record sheets have to be inserted.

Upon the casing wall 508 (Fig. 2) there is mounted by means of screws 830 a plate 831, into which are riveted pins 832. Upon the pins 832 are rockably mounted bell crank levers 833, whose forks 834 cooperate with bolts 835, 838 (Figs. 5 and 7). The connecting bolts 835, 836 are guided in slots 838 of plate 831 and in slots 840 of a plate 841, which is rigidly connected with the plate 831 by means of stay bolts 842 and screws 843.

To the connecting bolt 835 is connected, by means of a screw 844, a rod 845 (Figs. 2 and 7), which is coupled by a pin 846 to a bell crank lever 847. The bell crank lever is rockably mounted upon a shaft 848 fixed to the casing wall 506. To the lever 847 is connected, by means of a pin 849, a link 850 (Figs. 2 and 8), which is articulated to a lever 851 rockably mounted upon a pin 852 secured to a bearing plate 853. Upon the lever 851 a feeling finger 855 is secured by a bolt 854. The finger 855 is adapted to come into

contact with a record sheet inserted in a printing table 507. The downwardly projecting end of bolt 854 bears a pin 856 engaging in the fork 857 of a lever 858. The lever 858 is rockably mounted upon a pin 859 fixed in the bearing plate 853 and has a nose 880 adapted to coact with a pin 881 fixed upon the printing hammer 610D, to block the printing hammer.

To the connecting bolt 836 (Figs. 2 and 7) is attached a link 882, which is connected by a pin 883 to a bell crank lever 864 rockably mounted upon a shaft 885 fastened to the casing wall 508. To the lever 884 is connected by a pin 868 a link 887 (Figs. 2 and 8) which acts upon a lever 888 rockably mounted upon a pin 869 fixed to a bearing plate 670. To the lever 868 a feeling finger 872 is connected by bolts 871, this feeling finger being adapted to engage a record sheet inserted in a printing plate 507C. To the lever 884 (Figs. 2, 8 and 9) is riveted a pin 873, which engages in a fork 874 of a slide 875. The slide 875 is guided by means of a pin and slot connection 876 upon a plate 877, which is secured to the casing wall 508 by two screws 878. The slide 875 has a recess 879, which cooperates with a pin 880 fixed to the printing hammer 810C, to allow free movement to the printing hammer unless the slide 875 is moved far enough to the right in Fig. 9 to block the pin 880.

Similar feeler and blocking mechanisms to those just described are provided for the printing places A and B and they are operated by cross bolts 835' and 838' corresponding to the cross bolts 835 and 838. Parts of these mechanisms have been shown and referred to by similar reference numerals with the addition of the mark ('). A detailed description of them would be repetitious.

Upon a connecting bolt 881 (Figs. 2 and 7) a rail 883 (Figs. 2 and 17) is guided by slots 882. This rail is provided with lugs 884 and has mounted upon it slides 885 and 886 (Figs. 2, 16, and 16a), which are pulled together against the lugs 884 by springs 887. The rail 883 is connected by a pin 888 to a bell crank lever 890 rockably mounted upon a shaft 899. The arm 891 of the bell crank lever is connected to a bar 892, which is driven by a cam disk (not shown) to impart during each tion to the lever 890 and then a counterclockwise machine operation first a clockwise rocking m-rocking motion.

Upon the levers 833 there are fixed pins 893, which cooperate with slides 894—897 (Figs. 5, 6, 10—14) slidably mounted by slots 888 upon pins 899 fixed to plates 831 (Figs. 2 and 5). The slides 895 and 896 have abutments 900 and recesses 902, while the slides 894 and 897 have abutments 901. All of these abutments and recesses cooperate with the pins 893 fixed to the levers 833. There are two slides allotted to each printing place A, B, C, D, but there will be described in detail only the slides 894—895 which control the printing place C and the slides 896—897 for the printing place D, which are shown individually in Figs. 10—13. Those for the printing places A and B are similar and have similar numbers to which the mark (') has been added (Fig. 14). In the slide 896 is riveted a pin 903, upon which is loosely revolvable a pinion 904 (Figs. 2, 5, and 14), which engages the teeth 905 of slide 895. For holding the pinion 904 against lateral displacement there is provided on the slide 894 an arm 806 forming a slot 907 along which the pin 903 is guided. The pinion 904 also meshes with a pinion 908 (Fig. 5), which is rigidly connected by a tube

909 (Figs. 3 and 5) with a pinion 910 and through an intermediate pinion 911 with a rack bar 752. By the rack bar 752 and the pinions 753 (Fig. 2a) type wheels 912 at the printing place A, B, C, D, E are set, under the control of the slides 894—897, as will presently be described, in order to print upon record sheets at these respective printing places (for instance the account card or the contra-account card shown in Figs. 18 and 19) identifying figures to show whether an impression was taken at the printing places C and D.

The slides 894—897 are provided with notches 913 (Figs. 2, 10—13) in which engage levers 914 and 915 (Figs. 2 and 6). The slides 894 and 895 are associated with the lever 914, and the slides 896 and 897 with the lever 915. The levers 914 and 915 are rockably mounted upon a pin 916 of a lever 917, which rocks upon a shaft 918. To the arm 919 of the lever 917 is attached a rod 920, to which an up and down movement is imparted during each machine operation by driving mechanism not illustrated.

The mechanism described for indicating the printing places at which an impression has been taken operates in the following manner:

Assume that record sheets have been inserted at the two printing places C and D. During the machine operation the feeling fingers 855 and 872 are moved into contact with the record sheets by the parts 851, 850, 847, 845, the cross bolt 835, which is straddled tongs fashion by the slides 885, 886, the lugs 884 of the rail 883, the lever 890 and the bar 892, which is moved by a cam disk (not shown). This motion is practically without influence upon the levers 833 connected to the cross bolts 835 and 838 and their pins 893 consequently remain in the path of abutments 900. Therefore only the slides 894 and 897 are moved to the right in Fig. 2, through the action of lever 917, which is swung by a cam disk (not shown), and the levers 914, 915, because the slides 895 and 898 are stopped by the pins 893 against their abutments 900. A displacement of the type wheels 912 therefore does not occur, because the slides 894 and 897 are not connected with the pinion which sets the type wheel 912. Consequently on all record sheets the sign 925 which normally stands in printing position is printed, indicating the use of the printing places C and D.

If a record sheet is inserted only at the printing place D, on the next machine operation only the feeling finger 855 is stopped by a record sheet, while the feeling finger 872 can pass through the printing table, because no record sheet is inserted. The movement of the printing finger 872 is sufficient so that the pin 893 of the second lever 833 from the left in Fig. 2 comes into position to stop the abutment 901 of slide 894. Therefore, during the machine operation of lever 917 the slides 895 and 897 are moved to the right, because the slides 894 and 896 are stopped and the lever 914, 915, which engage in the slides 895, 897 swing in clockwise direction. Since the teeth 905 of slide 895 are in mesh with the pinion 904, there is a one space movement to the right (Fig. 2) of the corresponding rack bar, resulting in a one space counterclockwise rotation of all type wheels 912 of the assemblies A—E, to bring into printing position the sign 925 which indicates the printing place D, in order to show that only at this place was an impression taken.

If a record sheet is inserted only at the printing place C, on the next machine operation only the feeling finger 872 is stopped by a record sheet, while the finger 855 passes through the printing table. The slides 895 and 897 are therefore blocked and the pinion 904 is rolled to the right on rack teeth 905 by its axle 903. This causes a two space movement of rack bar 752 to the left and a two space clockwise rotation of the type wheels 912, into position to print a sign indicating that an impression was taken only at the printing place C.

If no record sheets are inserted at either C or D, the slides 894 and 897 are blocked, the pinion 904 and rack teeth 905 move simultaneously to the right, imparting a one space movement to the left to rack bar 752 and a one space clockwise rotation to the type wheels 912, into position to print a sign indicating that no impression was taken at either C or D.

The printing places A and B have similar devices for detecting whether an impression is being taken and controlling printing members to print corresponding signs. With such a mechanism the advantage is achieved that all the signs necessary for indicating the printing places can be arranged on two type wheels 912, 912' for each printing place.

The operation of the printing mechanism will now be described briefly once more as a whole:

As previously stated, the printing mechanism includes five printing places A-E. The printing places B and D are of particular importance to this invention, because an impression is taken in a single machine operation in posting debits and credits, both at the printing place B for the account and at the printing place D for the contra-account. At the same time it is necessary that in posting debits and credits, for example, a deposit of an account owner, an impression be made in the credits column of the account card, while the contra-account card an impression is made in the debits column (Figs. 18 and 19). For this purpose the sets of type wheels for printing debits and credits are arranged in reversed stepped position at the two printing places B and D (Fig. 20).

On posting debits and credits special signs are printed on all the record sheets, particularly those for the printing places A, B, D. The type wheels which print these special signs and which are mounted in a separate frame are only moved into printing position on posting debits and credits and in taking sub-totals and end-totals from the totalizers for the old balance, for the debits and credits, for the cancellations, for the corrective entries, and for the total debits and credits. The striking force of the printing hammer at each printing place is at the same time so regulated that on all other operations the striking force of the printing hammer is reduced by the action of the plate 788 (Fig. 2) blocking out all the printing springs 791. That is to say, upon movement of the special sign type wheel frame out of the printing position the plate 788 is moved to throw its lip 789 in front of the collars 790, so that only the much weaker springs 791a are operative.

The coordination of the individual printing places, particularly the printing places A, B, D for the account and the contra-account, makes it necessary to print a sign on the record sheets identifying those printing places at which a record sheet has been inserted and an impression made upon it. For instance, if record sheets are

inserted at the places A, B and D and a series of entries is made, all of the inserted record sheets and the control strip show a sign from which it can be determined that an impression was made at the printing places A, B, D, while no record sheet was inserted and printed at the printing place C.

In order to ensure proper coordination, particularly of the printing places for the account (B) and the contra-account (D), in carrying out different kinds of bookkeeping operations, the printing hammer of the printing place D is normally blocked and is only released when an old balance key for the balance mechanism II is pressed and blocked again when the new balance is taken from the balance mechanism II, or when the total or sub-total are taken from the old balance totalizers for the balance mechanism II. For this purpose the following device is provided:

The printing hammer 810D for the printing place D is controlled by the setting means 17, 18, 21 and 22 (Figs. 23 and 24), the setting means 17 and 18 serving for old balances in the balance mechanism II and the setting means 21 and 22 for cancellation and corrective entries. (As stated in the brief description of Figs. 23 and 24, the keys shown in these figures are arranged differently in the machine and are shown in a single bank in these views only for convenience of illustration). The setting keys 17, 18, 21 and 22 act through their pins 747 upon a slide 927 which is under the influence of a spring 927' tending to pull the slide downward. A pin 928 connects this slide to a bar 929, the opposite end of which is attached to a lever 931. The lever 931 is connected to a lever 934 rockably mounted upon a shaft 932 and under the influence of a spring 933. The lever 934 bears a roller 935, which coacts with a cam 837 fixed to a shaft 936.

Upon a shaft 938 is rockably mounted a lever 939, to which is connected a bar 940. The opposite end of this bar is articulated to a lever 941, which is connected to a lever 943 rockably mounted on a shaft 942. A bar 944 is connected to the other side of lever 943 and to a latch 946 which is rockably mounted upon a shaft 947 and pulled downward by a spring 945. The latch 946 has a hook 948 which engages behind a pin 949 fixed to the arm 809D of printing hammer 810D. The printing hammer 810D coacts with type wheels 703 of the printing place D for the contra-account. To the pin 749 is connected one of the previously mentioned rods 793, which is under the influence of springs 791 and 791a bearing against the stationary plate 794. The reciprocation of the rod 793 by the springs is controlled by a cam disk 803, as previously described.

The lever 943 has a hooked nose 950 and coacts with a nose 851 of a latch 954 rockably mounted upon a pin 952 and pulled in clockwise direction by a spring 953. A pawl 955 having a nose 956 adapted to coact with the latch 954 is attached to a lever 959 rockably mounted upon a shaft 957 and pulled in counterclockwise direction by a spring 958. The lever 959 has an upwardly extending arm upon which is mounted a roller 960 controlled by a cam 961. To the pawl 955 is attached a bar 963, whose other end is connected by a pin 964 to a slide 965. The slide 965 is controlled by a pin 47 of the setting key 13, which sets the machine for taking the new balance from the balance mechanism II.

The operation of the described mechanism is as follows:

If a series of entries is carried out which con-

sists of the old balance of an account and a contra-account, one or more debits and credits, and the new balance of the account and the contra-account, the contra-account is reckoned in the balance mechanism II. In this case the printing place D at which the contra-account card is printed must be made operative, which is done by pressing one of the releasing keys 17, 16, 21 or 22. This moves the lever 931 into position to coact with lever 941. Immediately after the release of the machine operation the cam 937 is turned in counterclockwise direction, whereby the latch 946 is removed from the pin 949, through the intermediary of the parts 935, 934, 931, 941, 943, 944, thereby releasing the printing hammer 810D. At the same time the nose 950 is caught by the latch 951 and the printing hammer remains released.

Now there can be carried out as many debit and credit postings as desired, without the printing hammer 810D being locked again. Only on taking the new balance from the balance mechanism II does the latch 946 become operative after the impression is printed, and thereby the printing hammer 810 is again locked. This is accomplished by movement of the pawl 955 to the left by the action of slide 965, to the dotted line position, followed by the action of cam 962 upon the parts 960, 959, 955, which swings the latch 954 in counterclockwise direction, thus releasing the

hooked nose 950 of the lever 943 and allowing the spring 945 to pull down the latch 946.

In order to be able to use the printing mechanism D for printing on a reckoning sheet also in drawing an end-total or sub-total from the totalizers allotted to the keys 17, 18, 21 and 22, the pawl 955 is also connected by a bar 966 with a slide 967, by a pin 968. The keys 29 and 38 for drawing sub-totals and end-totals act upon the slide 967 by pins 47, which move the slide downward. By this motion the pawl 955 is brought into the range of latch 954, so that immediately after each printing of a sub-total or end-total by the release of the latch 954 the printing hammer 810D is locked, contrary to the condition in printing old balances and debits and credits.

The diagram of operation shown in Fig. 25 illustrates the control of the individual printing places in carrying out a series of entries consisting of the old balance of an account, one or more debits and credits, and the drawing of a new balance; whereas the diagram of operation in Fig. 26 shows the control of the individual printing places in carrying out a series of entries consisting of the old balance of the account and a contra-account, one or more debits and credits, and the drawing of a new balance of the account and the contra-account.

KURT AURBACH.