

April 14, 1942.

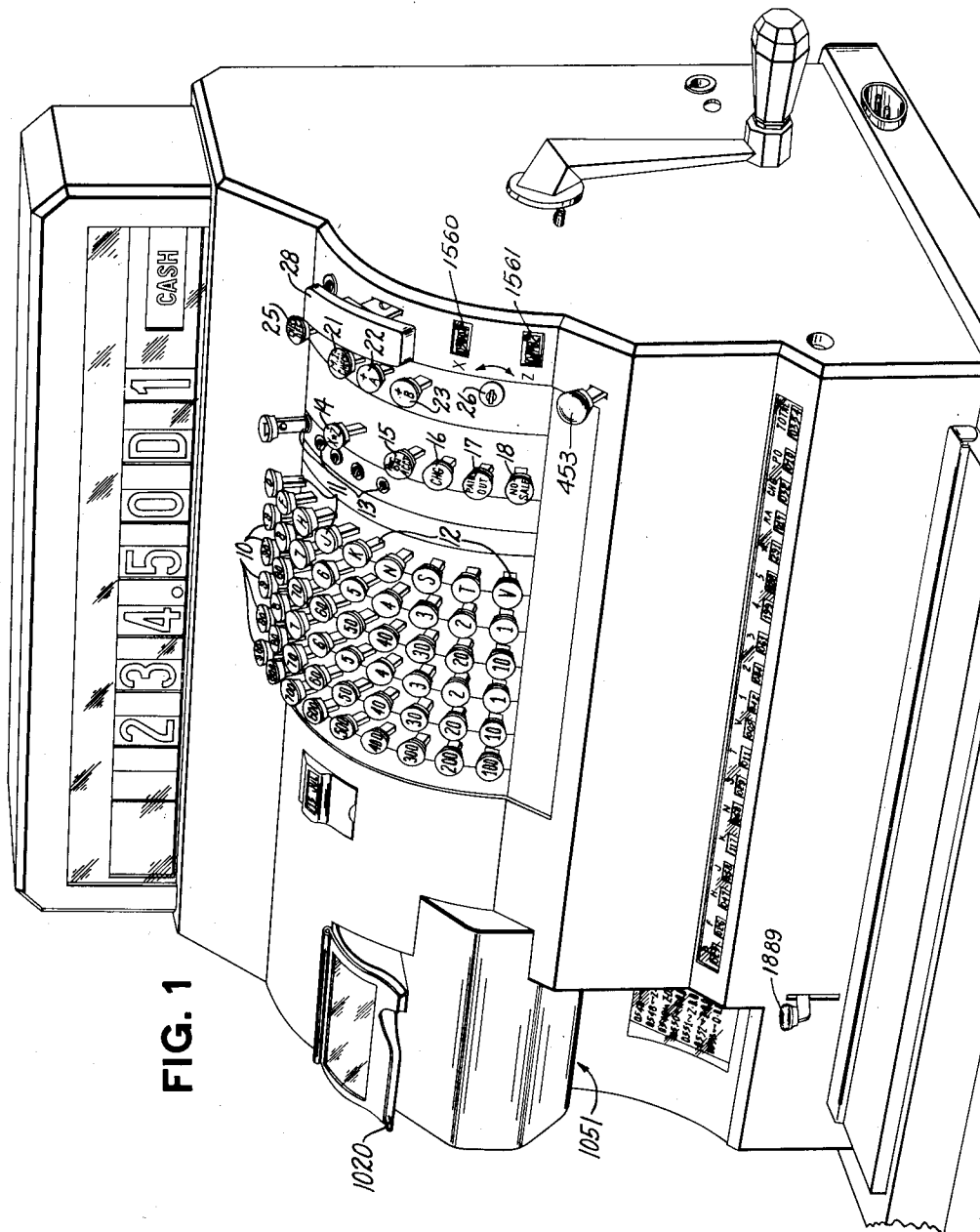
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Georg Topel and
Otto Philipp
Inventors

By *Karl Benst*
Their Attorney

April 14, 1942.

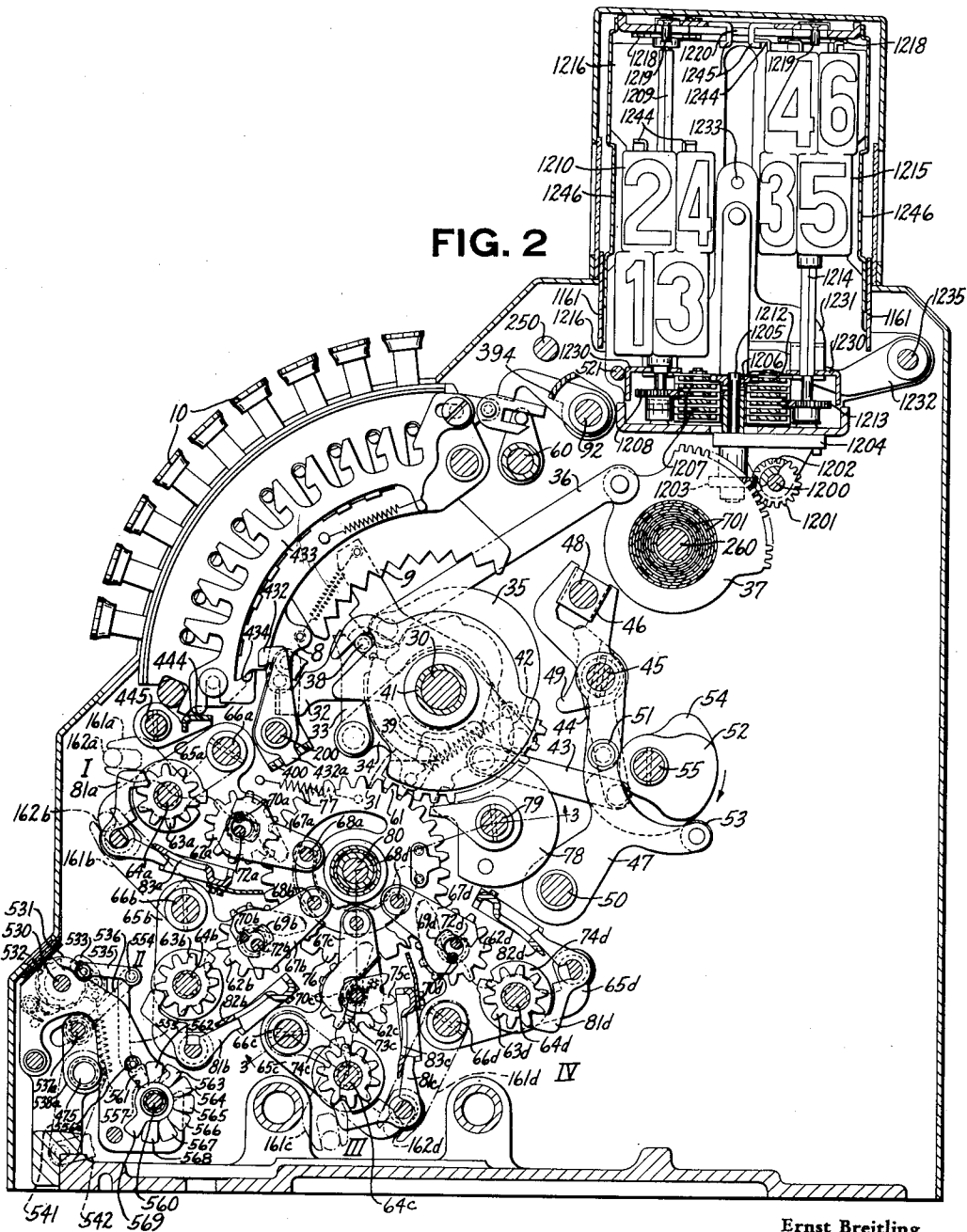
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**Ernst Breitling
Georg Topel and
Otto Philipp
Inventors**

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Their Attorney

April 14, 1942.

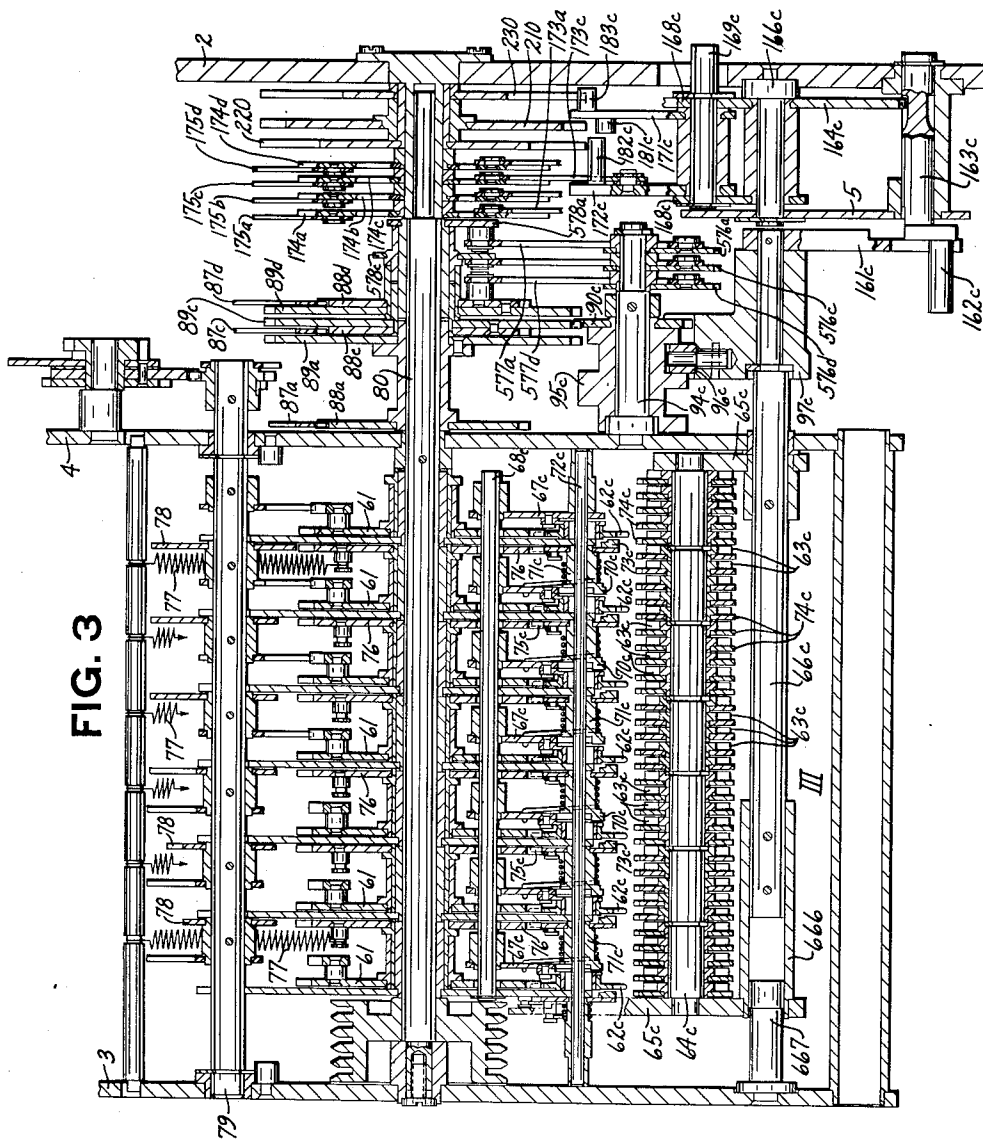
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Georg Topel and
Otto Philipp
Inventors

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Their Attorney

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FIG. 4

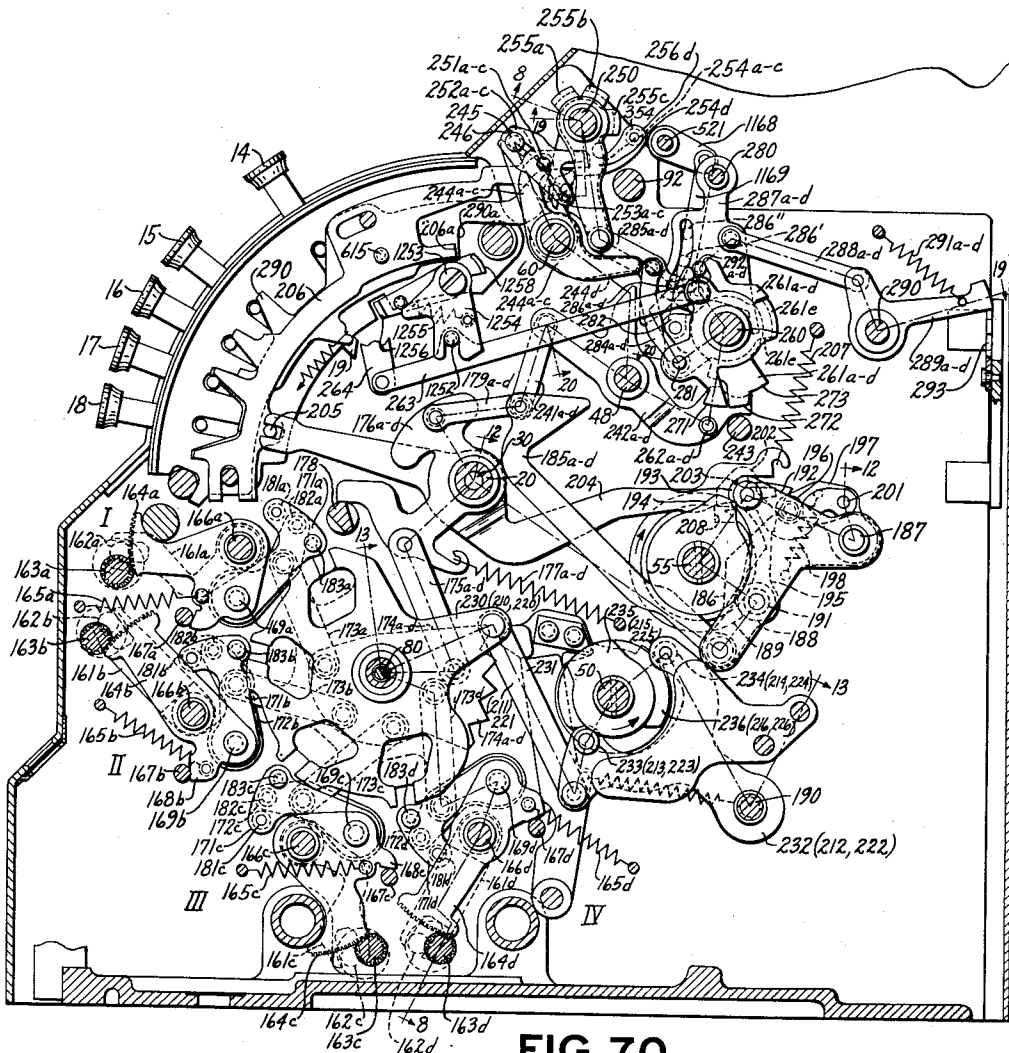
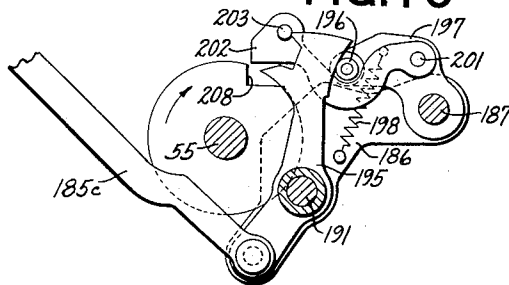


FIG. 70



Ernst Breitling
Georg Topel and
Otto Philipp
Inventors

By *Karl Beinst*
Their Attorney

April 14, 1942.

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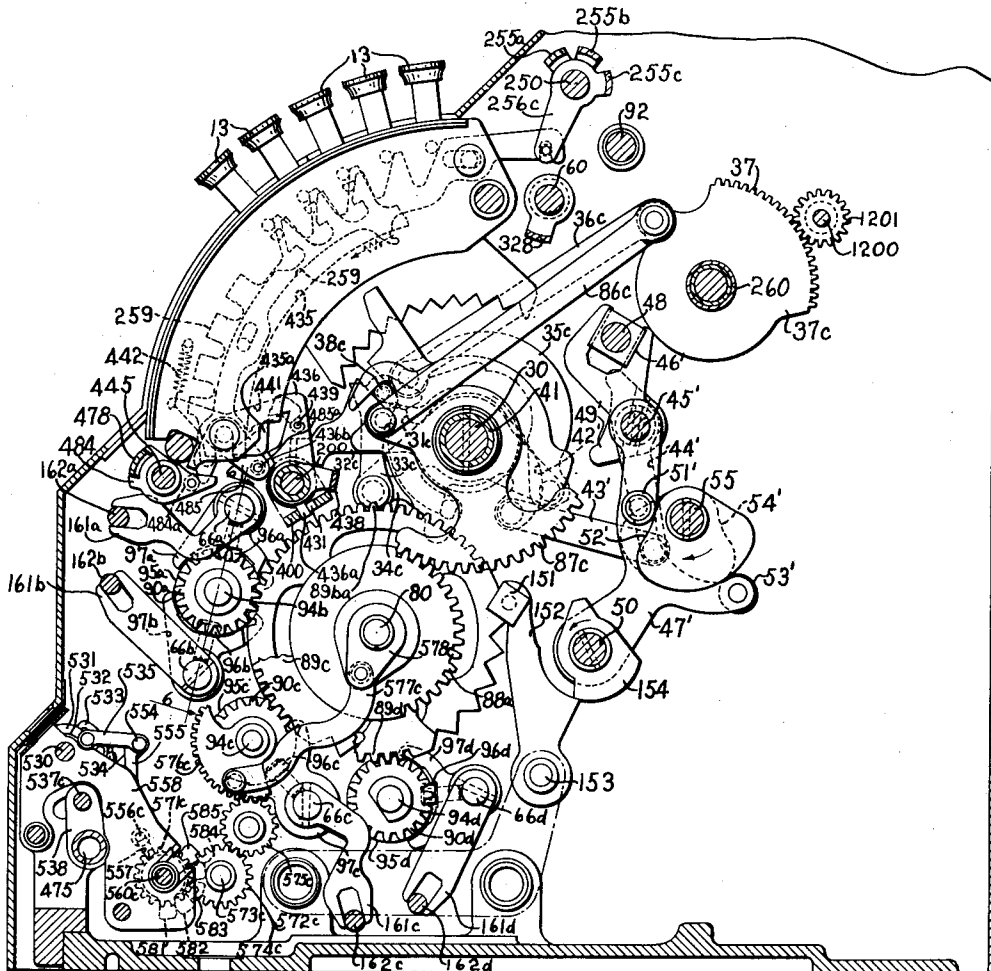
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FIG. 5



Ernst Breitling
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Otto Philipp
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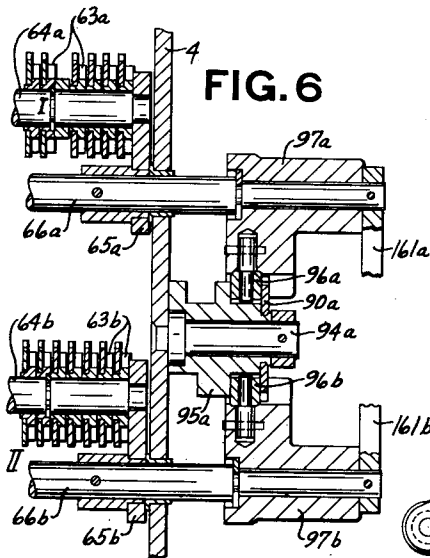


FIG. 6

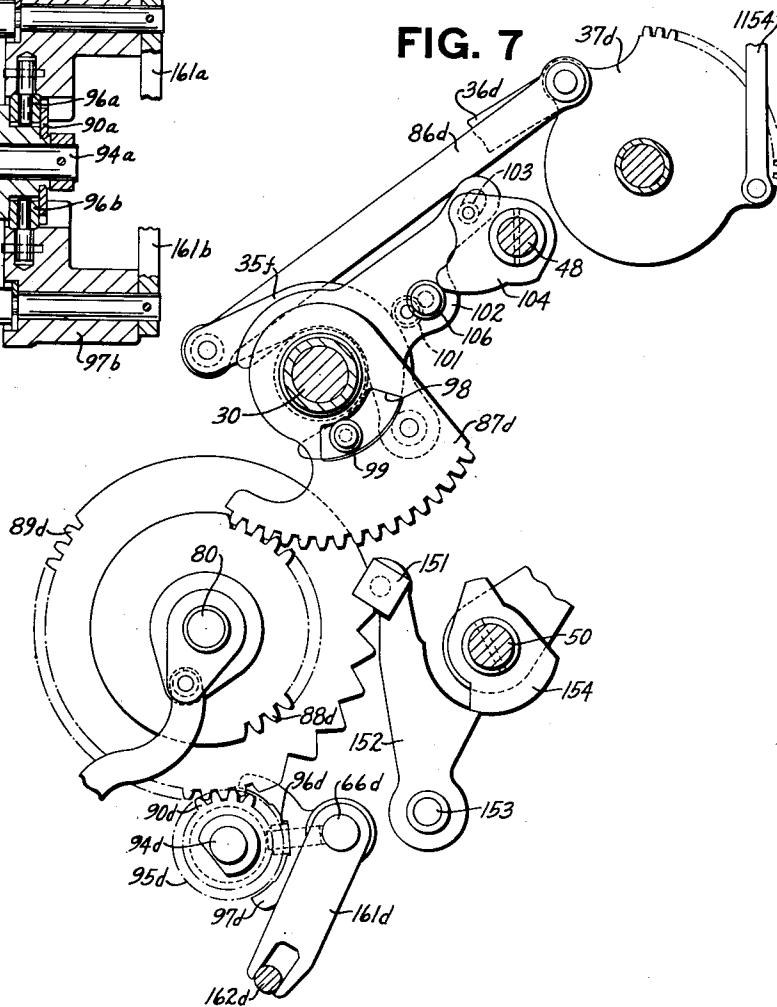


FIG. 7

Ernst Breitling
Georg Topel and
Otto Philipp
Inventors

By *Karl Benst*
Their Attorney

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FIG. 34

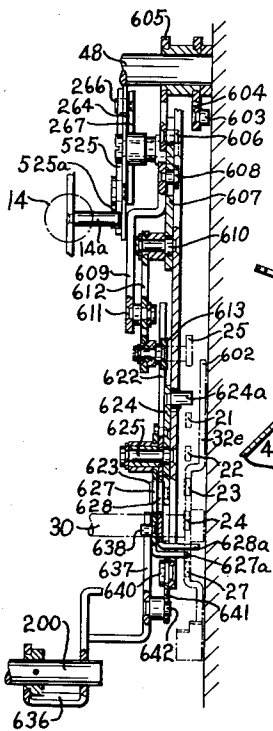


FIG. 9

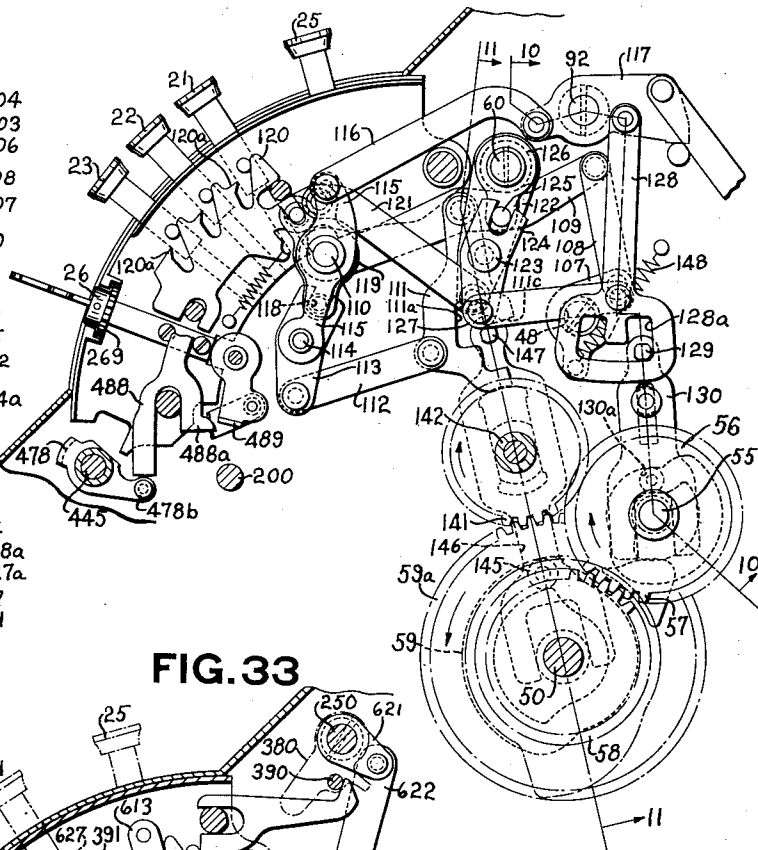
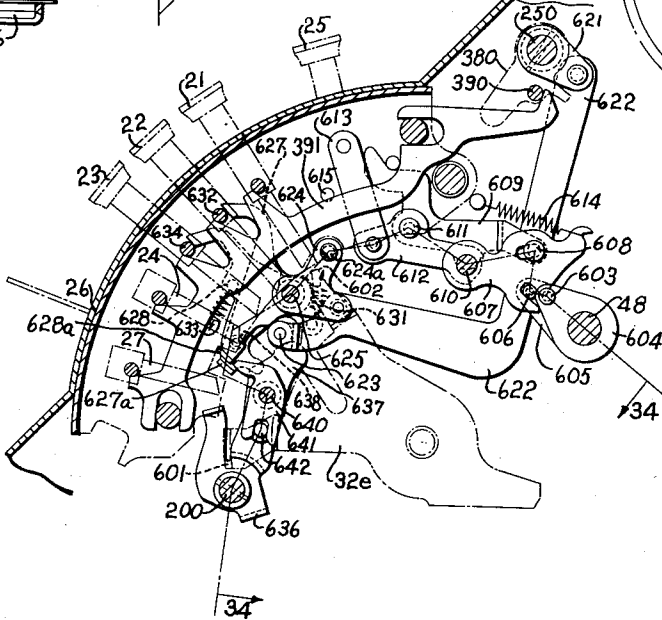


FIG. 33



Ernst Breitling
Georg Topel and
Otto Philipp
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Their Attorney

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FIG. 10

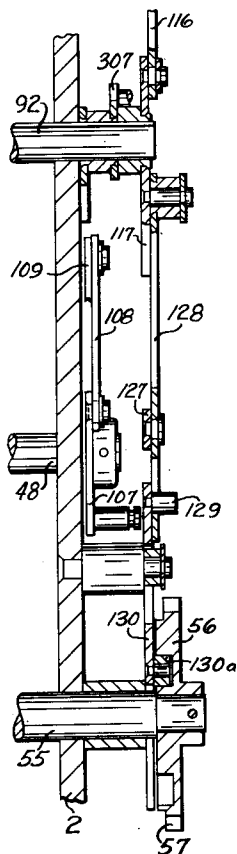


FIG. 11

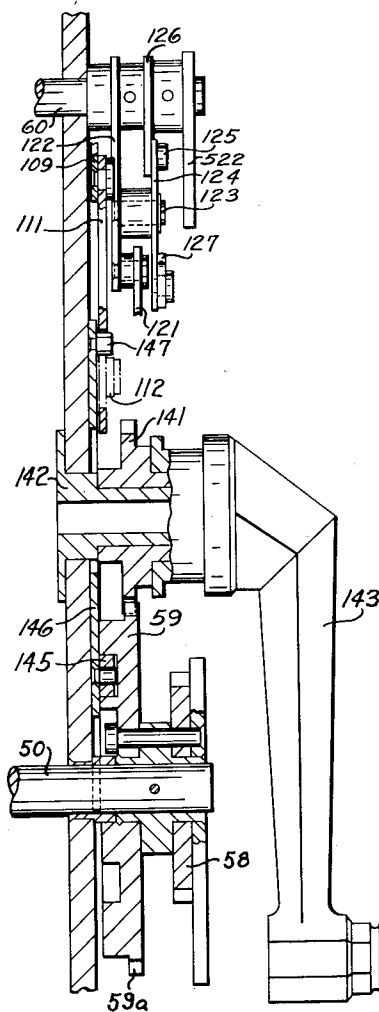
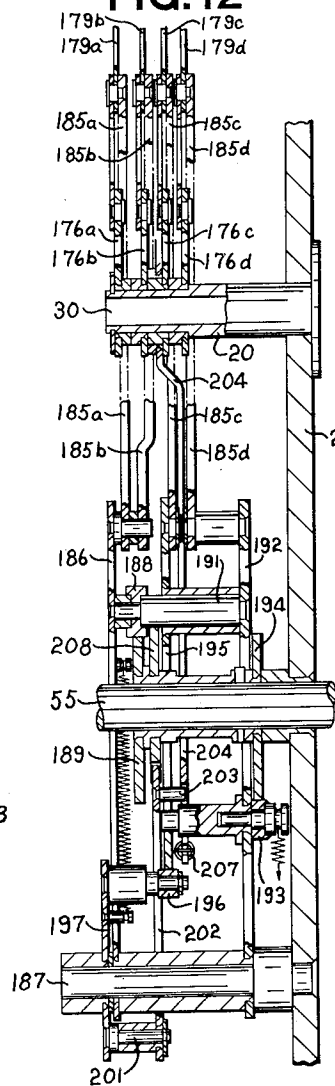


FIG. 12



Ernst Breitling
Georg Topel and
Otto Philipp
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By *Heard Beust*
Their Attorney

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FIG. 13

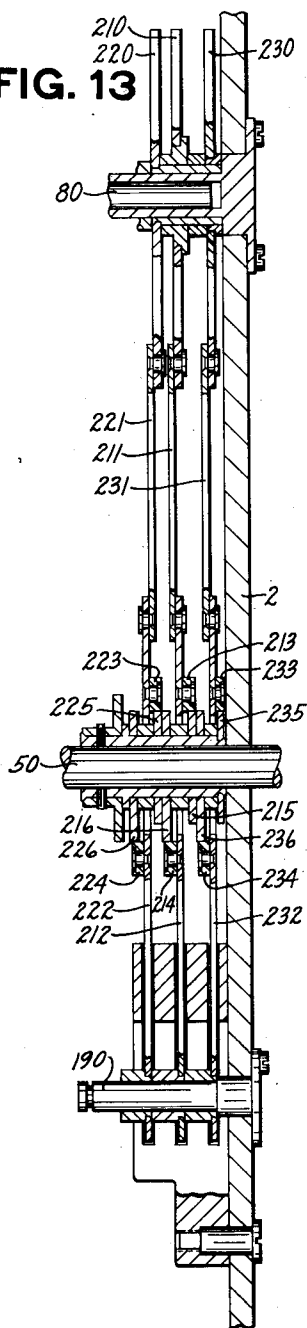
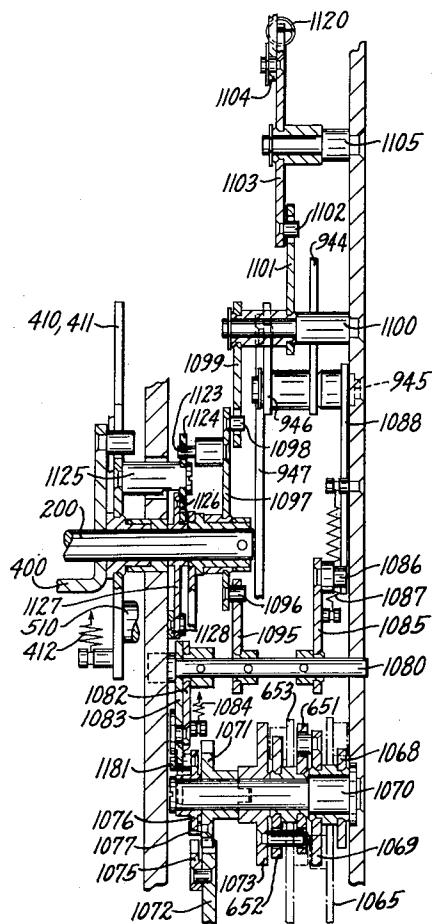


FIG. 62



Ernst Breitling
Georg Topel and
Otto Philipp
Inventors

By *Carl Beust*
Their Attorney

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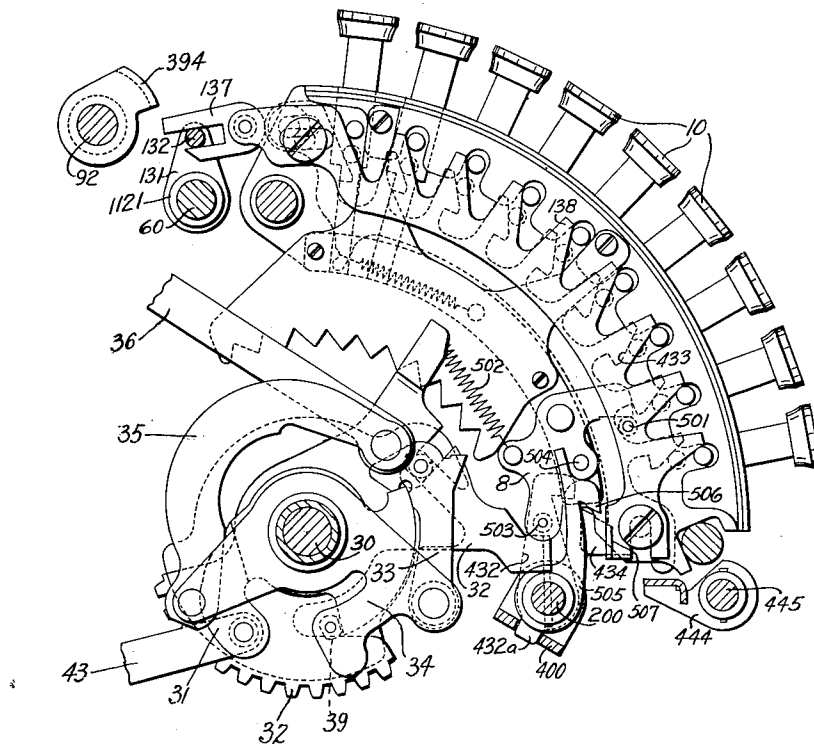
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FIG.14



Ernst Breitling
Georg Topel and
Otto Philipp
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Their Attorney

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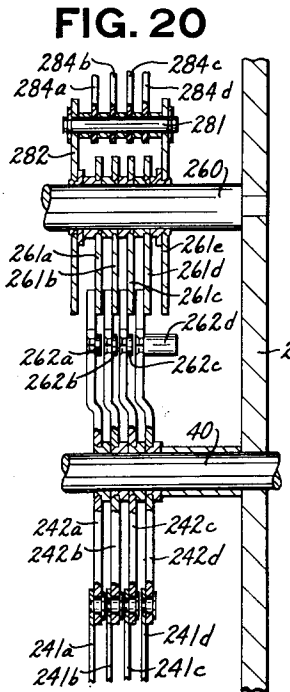
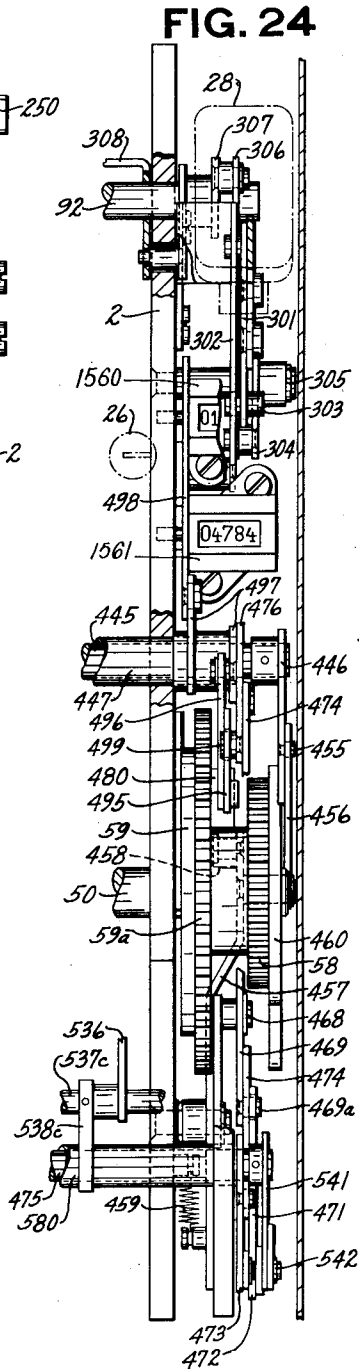
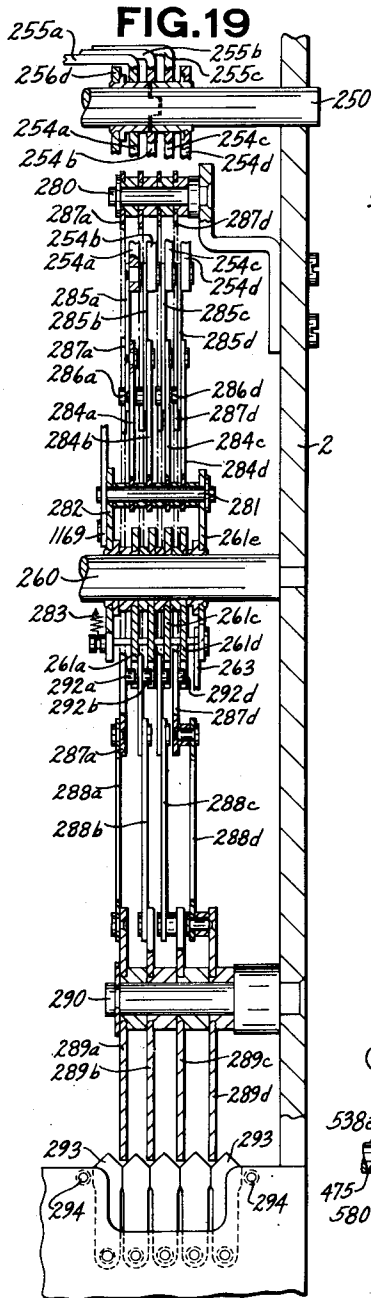
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Ernst Breitling
Georg Topel and
Otto Philipp
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FIG. 21

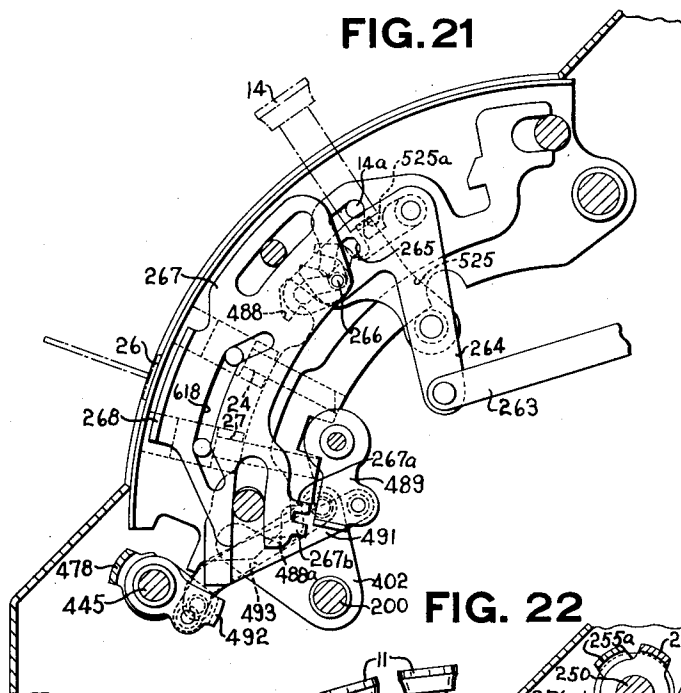
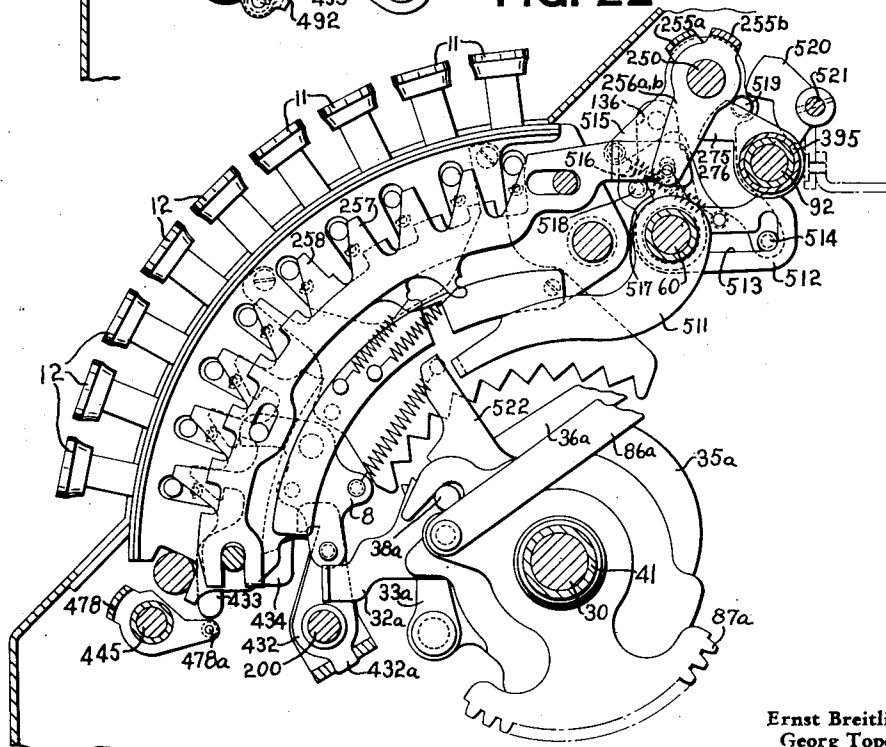


FIG. 22



By Heard Beust
Their Attorney

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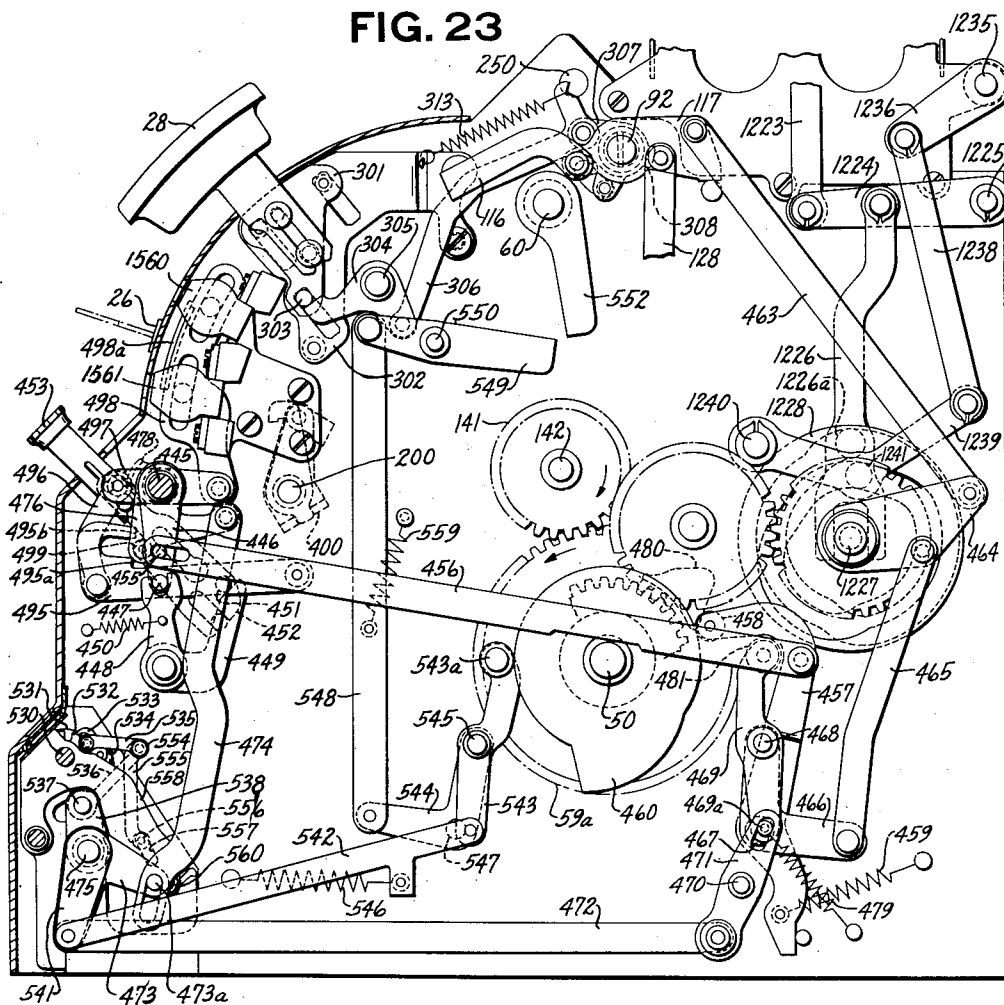
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FIG. 23



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Georg Topel and
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Their Attorney

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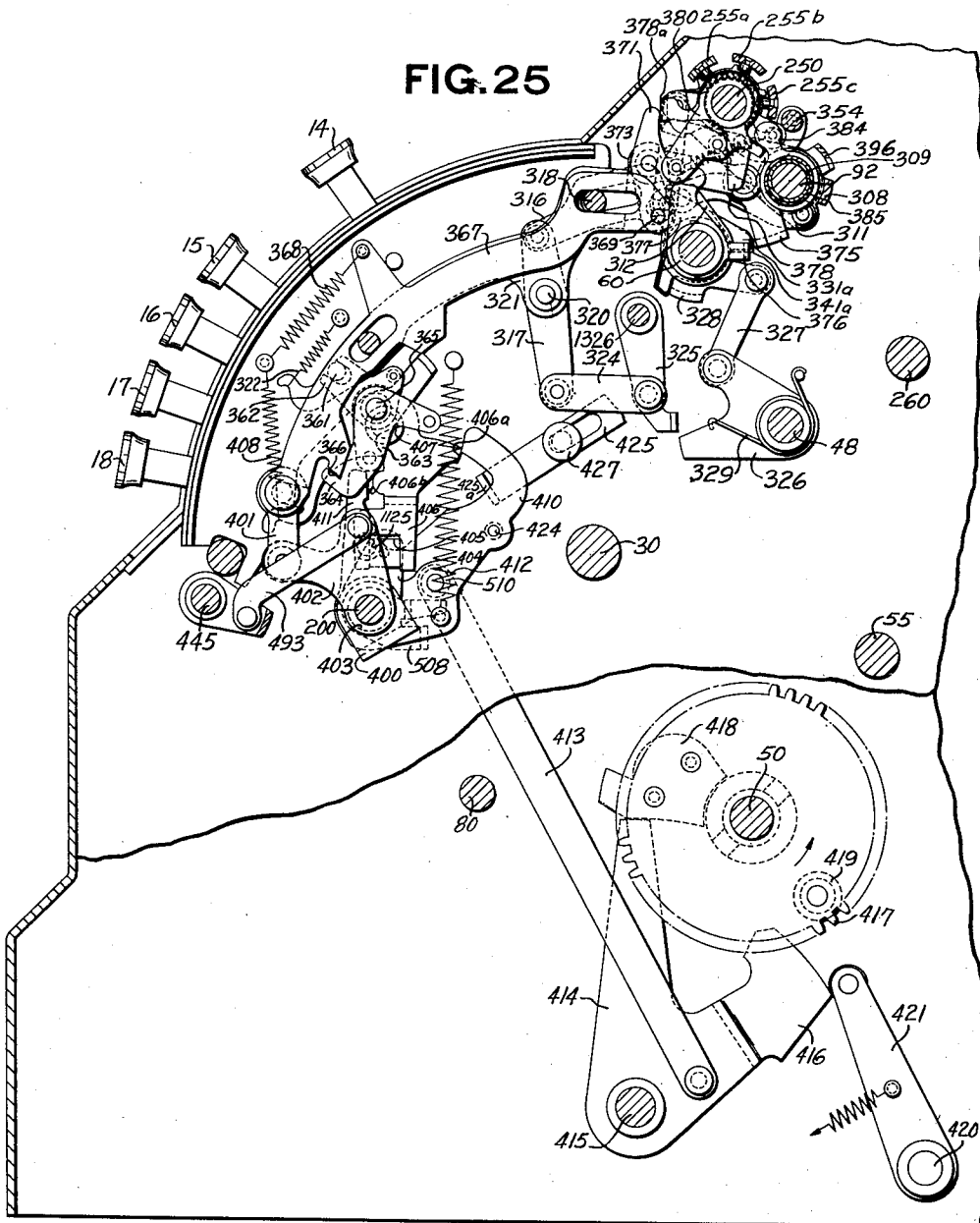
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Georg Topel and
Otto Philipp
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FIG. 27

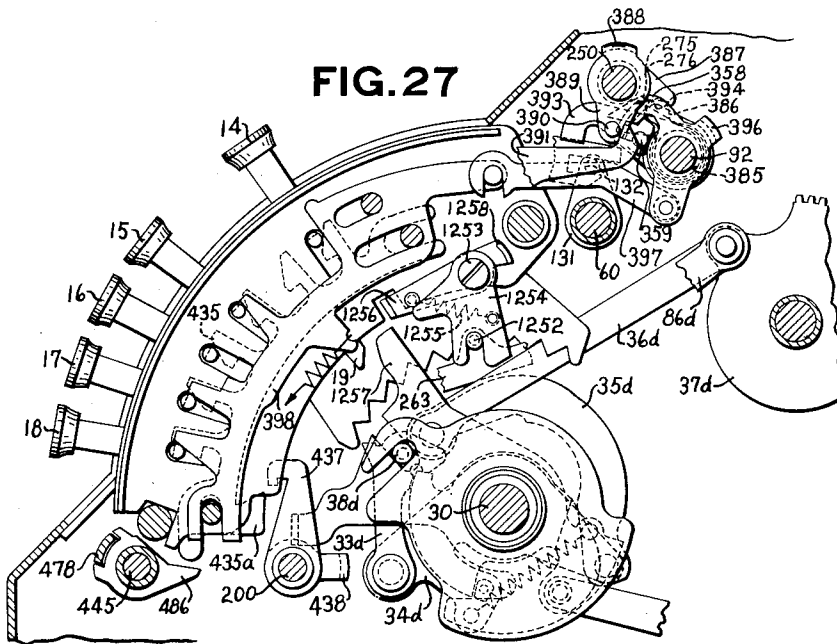
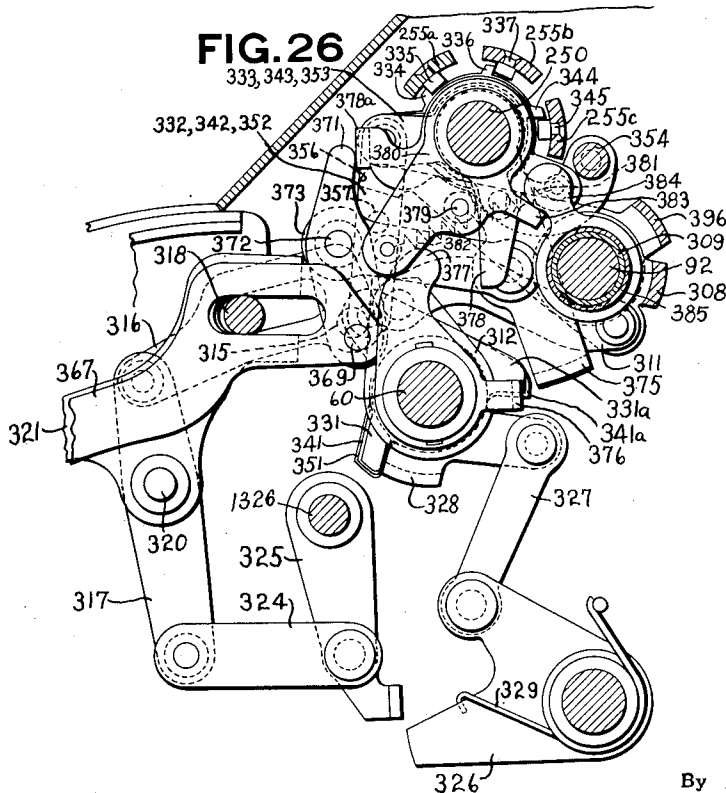


FIG. 26



Ernst Breitling
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Otto Philipp
Inventors

By *Heard Beust*
Their Attorney

April 14, 1942.

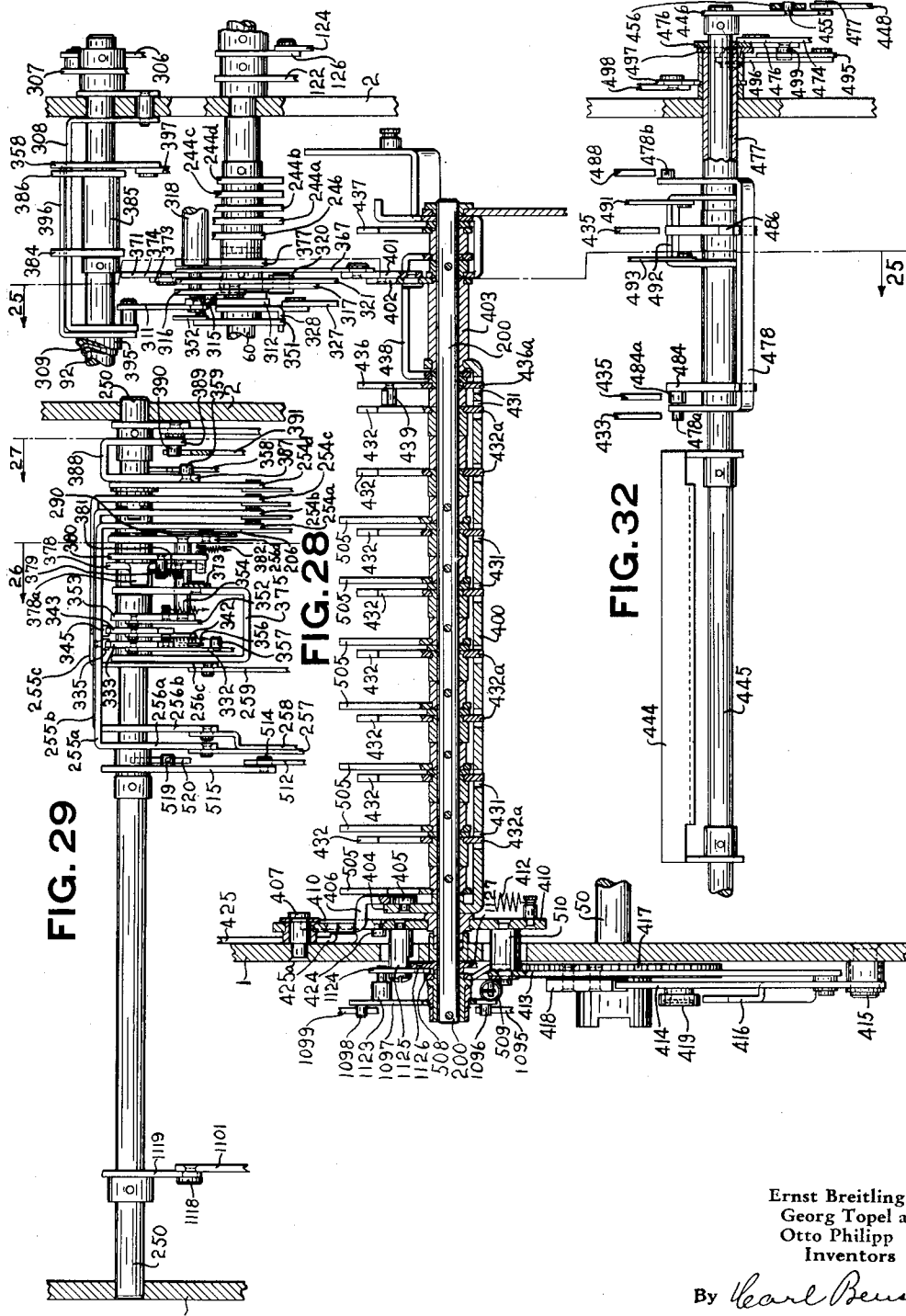
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FIG. 37

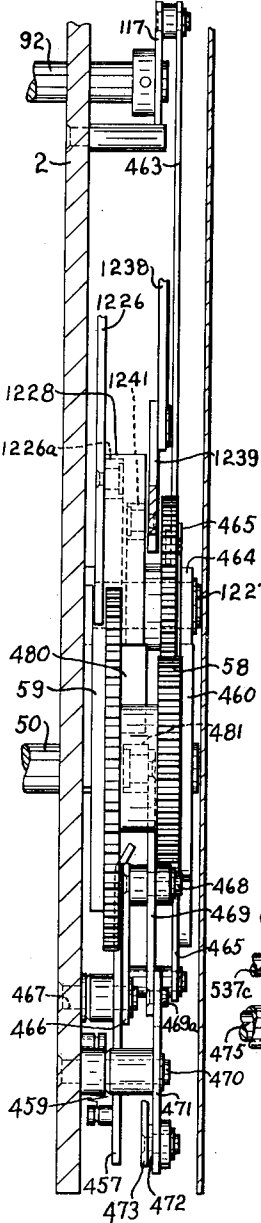


FIG. 38

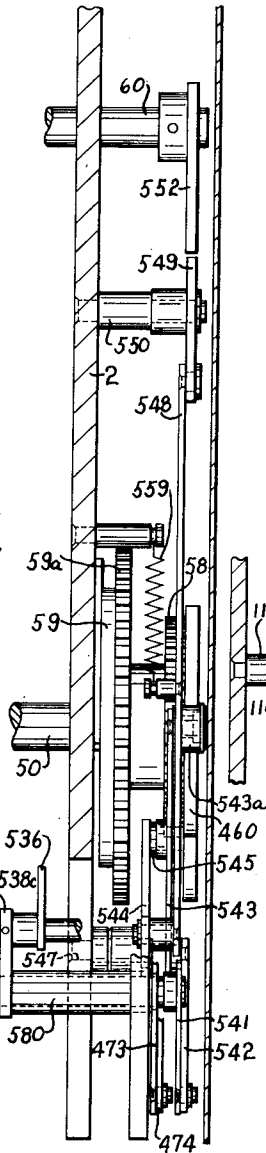
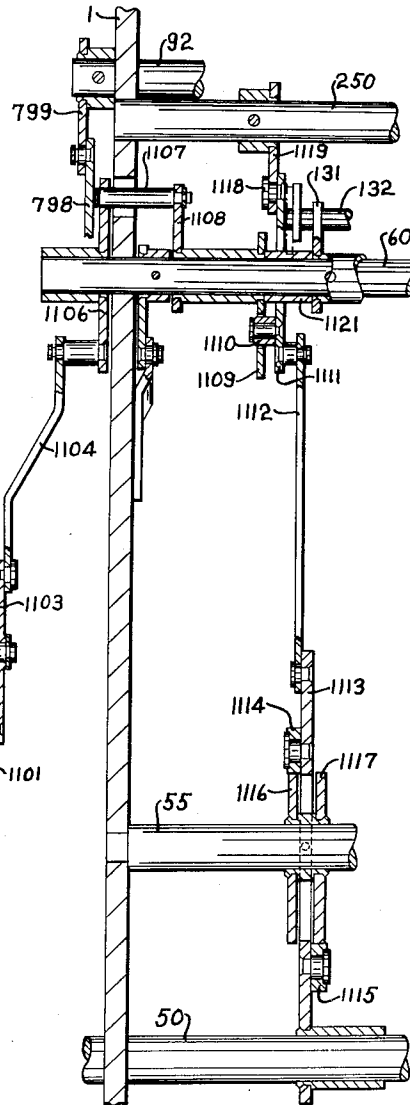


FIG. 39



Ernst Breitling
Georg Topel and
Otto Phiipp
Inventors

By *Carl Benet*
Their Attorney

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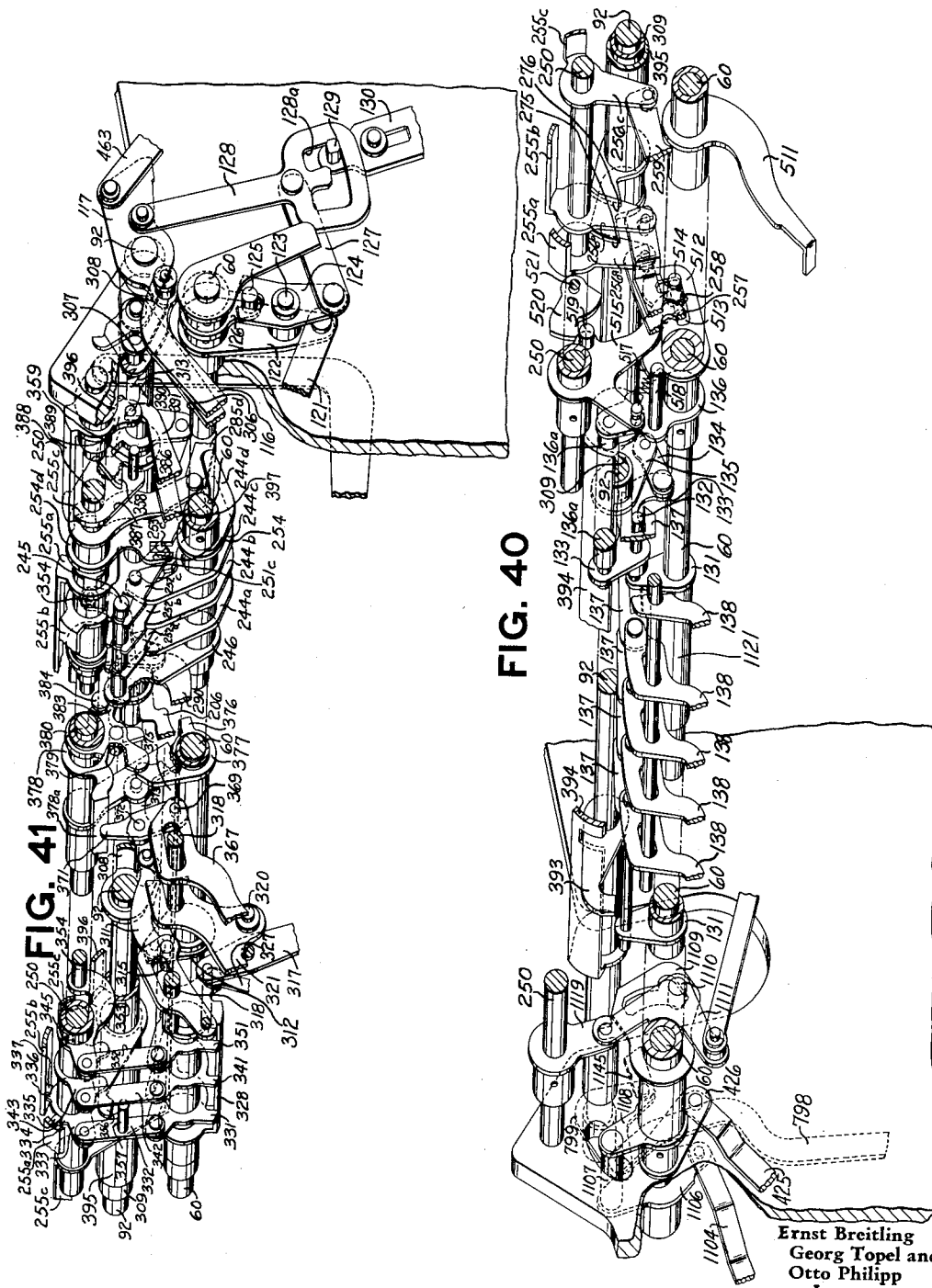
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Georg Topel and
Otto Philipp
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Their Attorney

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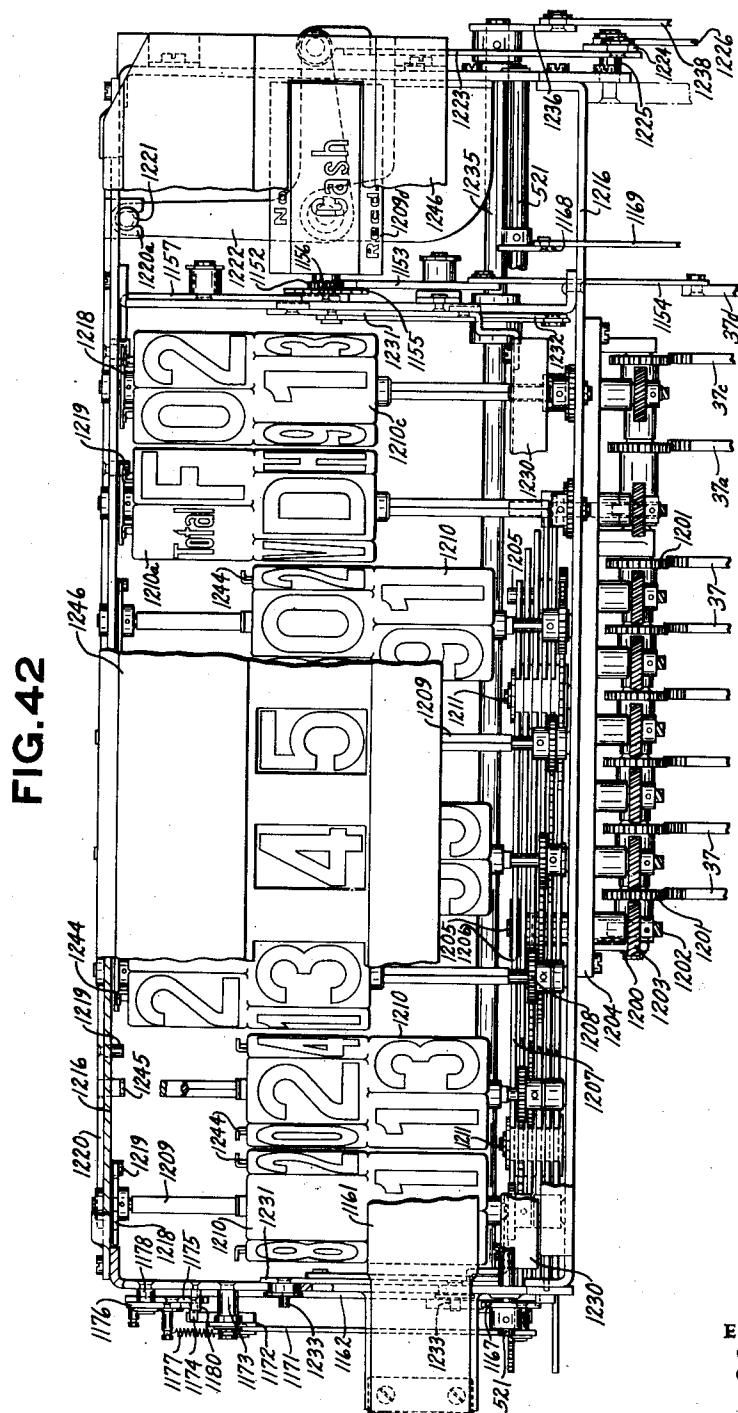
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Georg Topel and
Otto Philipp
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Their Attorney

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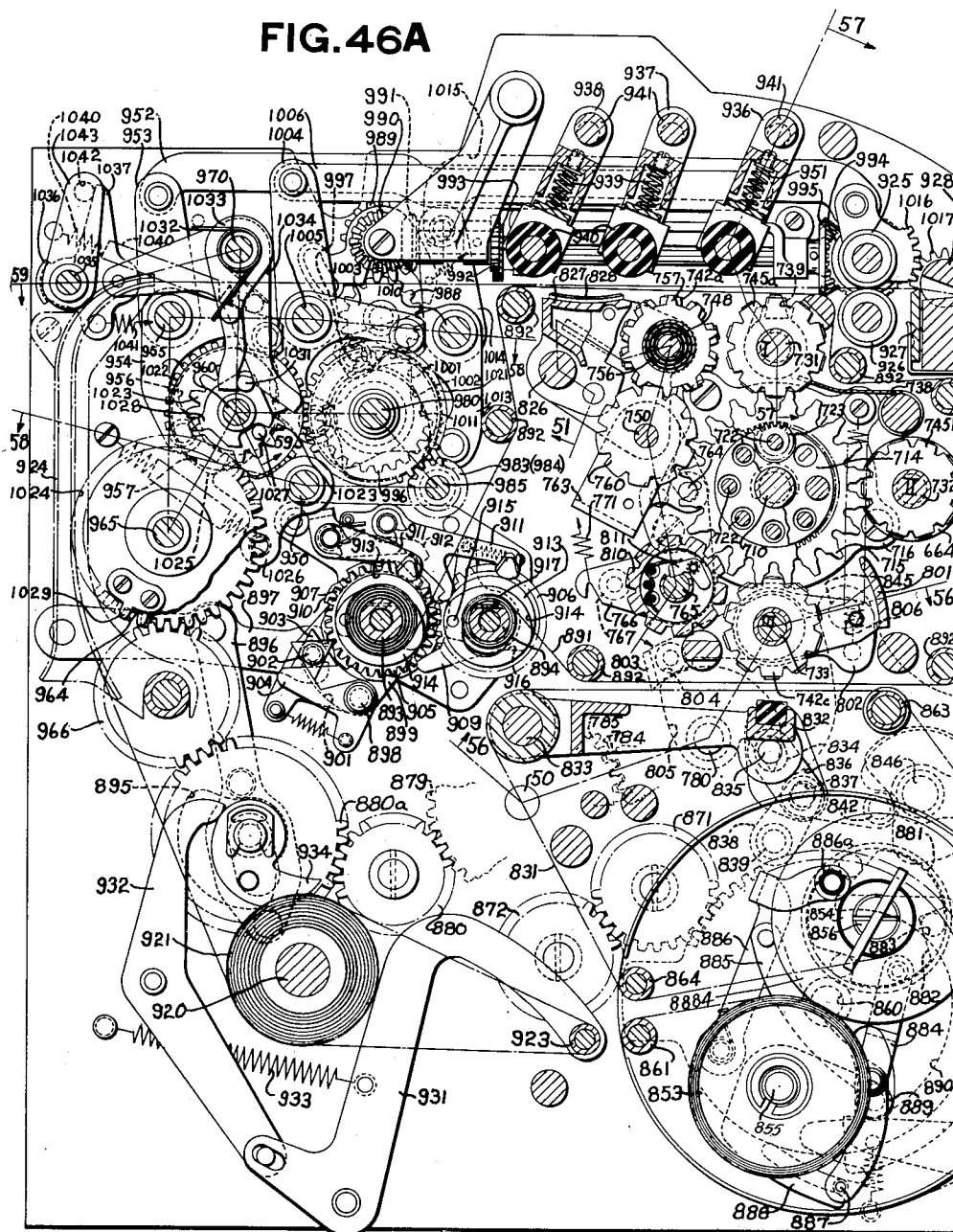
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FIG. 46A



**Ernst Breitling
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Otto Philipp
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FIG. 46B

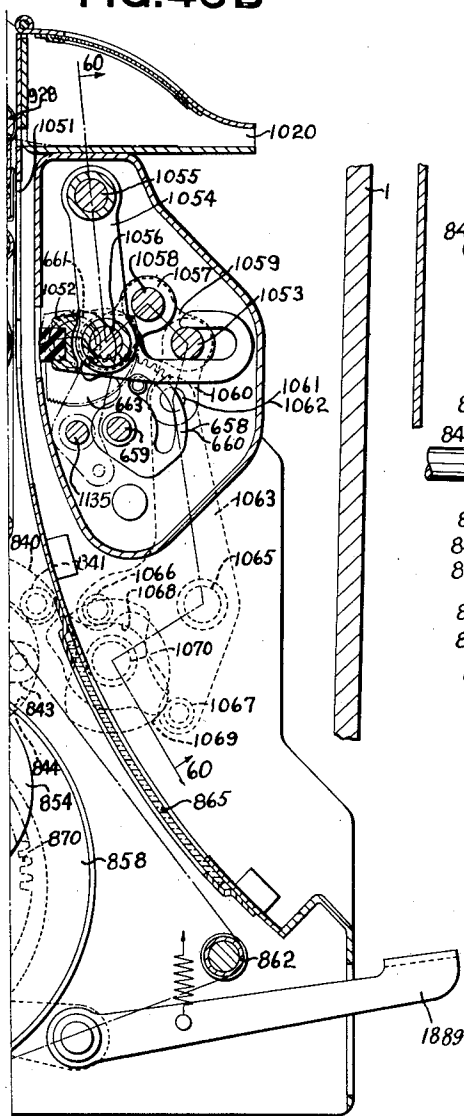
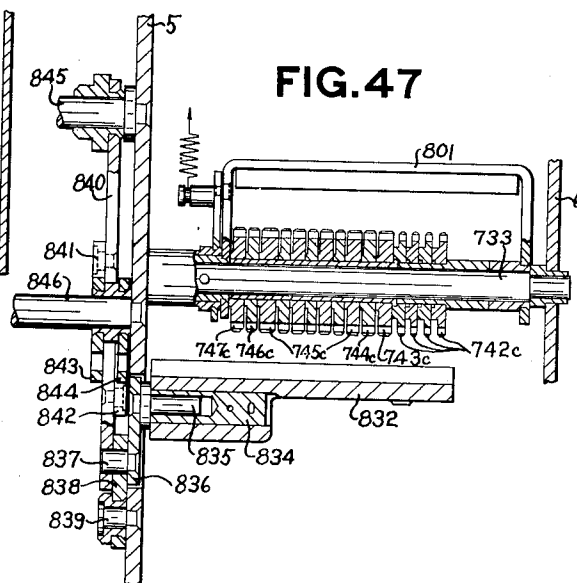


FIG. 47



Ernst Breitling
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Otto Philipp
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FIG. 48

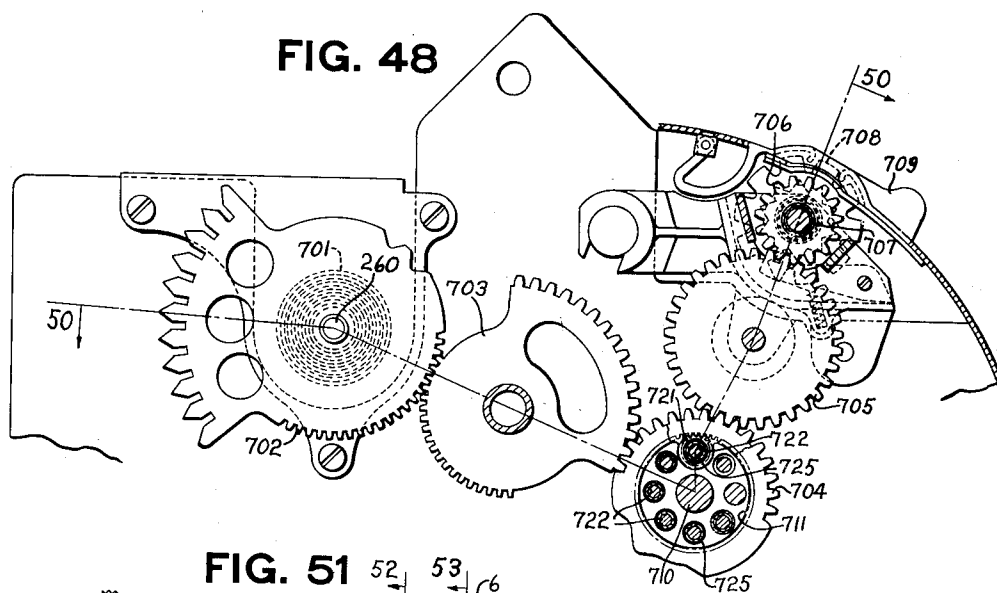


FIG. 51

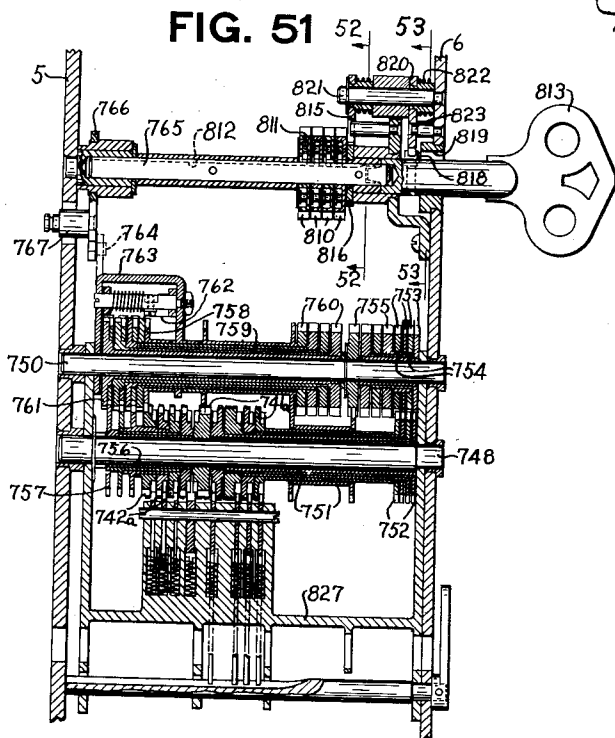


FIG. 52

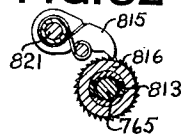
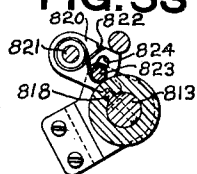


FIG. 53



Ernst Breitling
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Otto Philipp
Inventors

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Their Attorney

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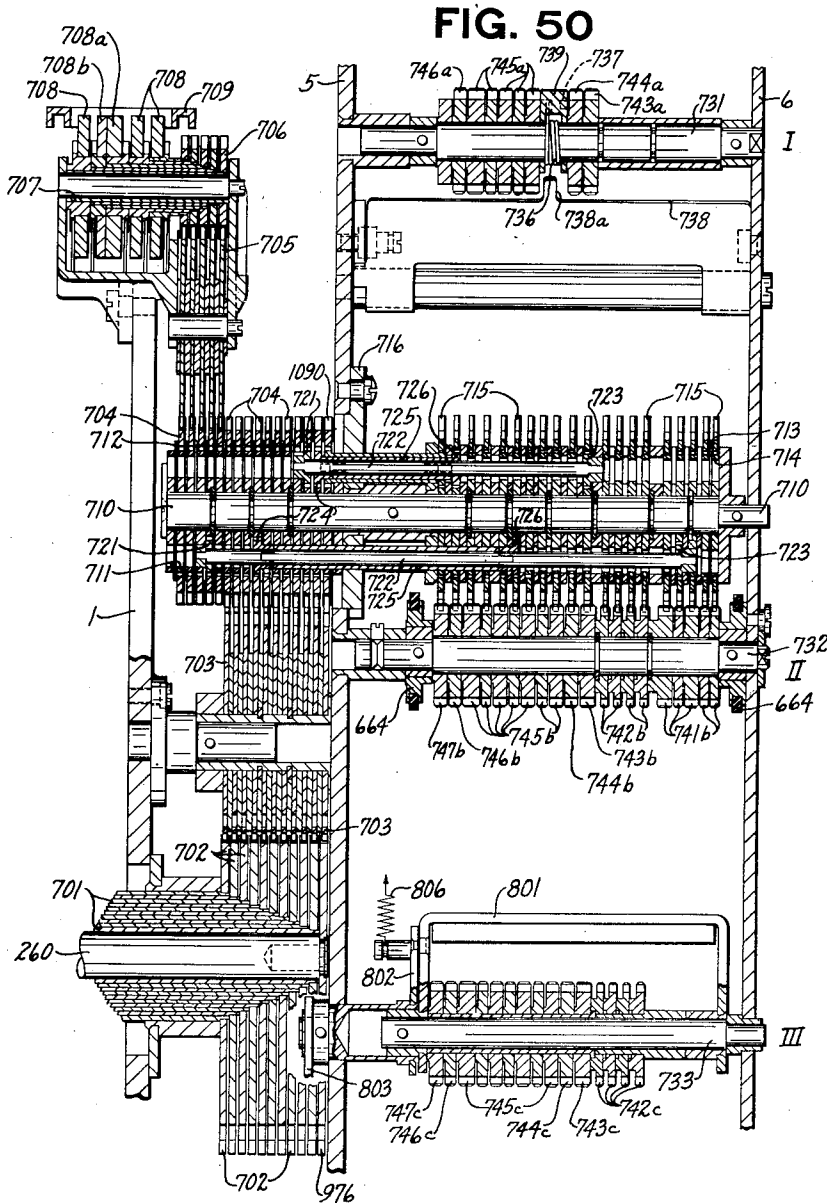
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Ernst Breitling
Georg Topel and
Otto Philipp
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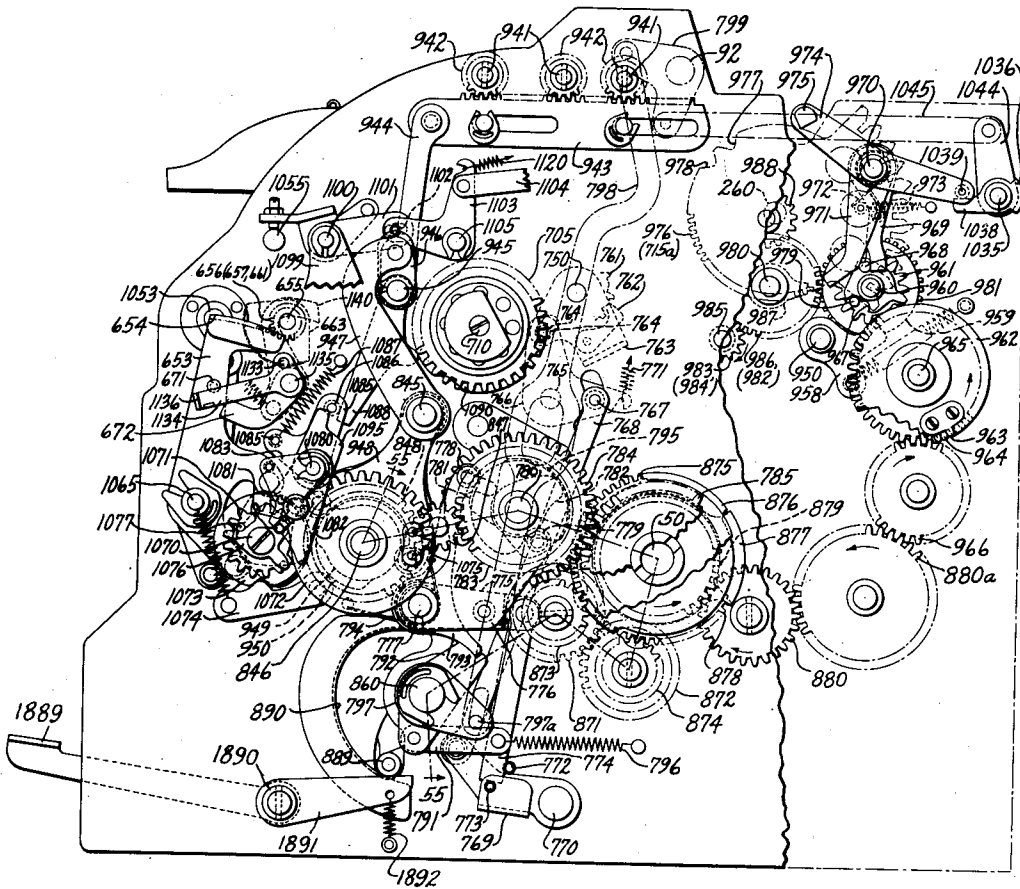
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FIG. 54



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Otto Philipp
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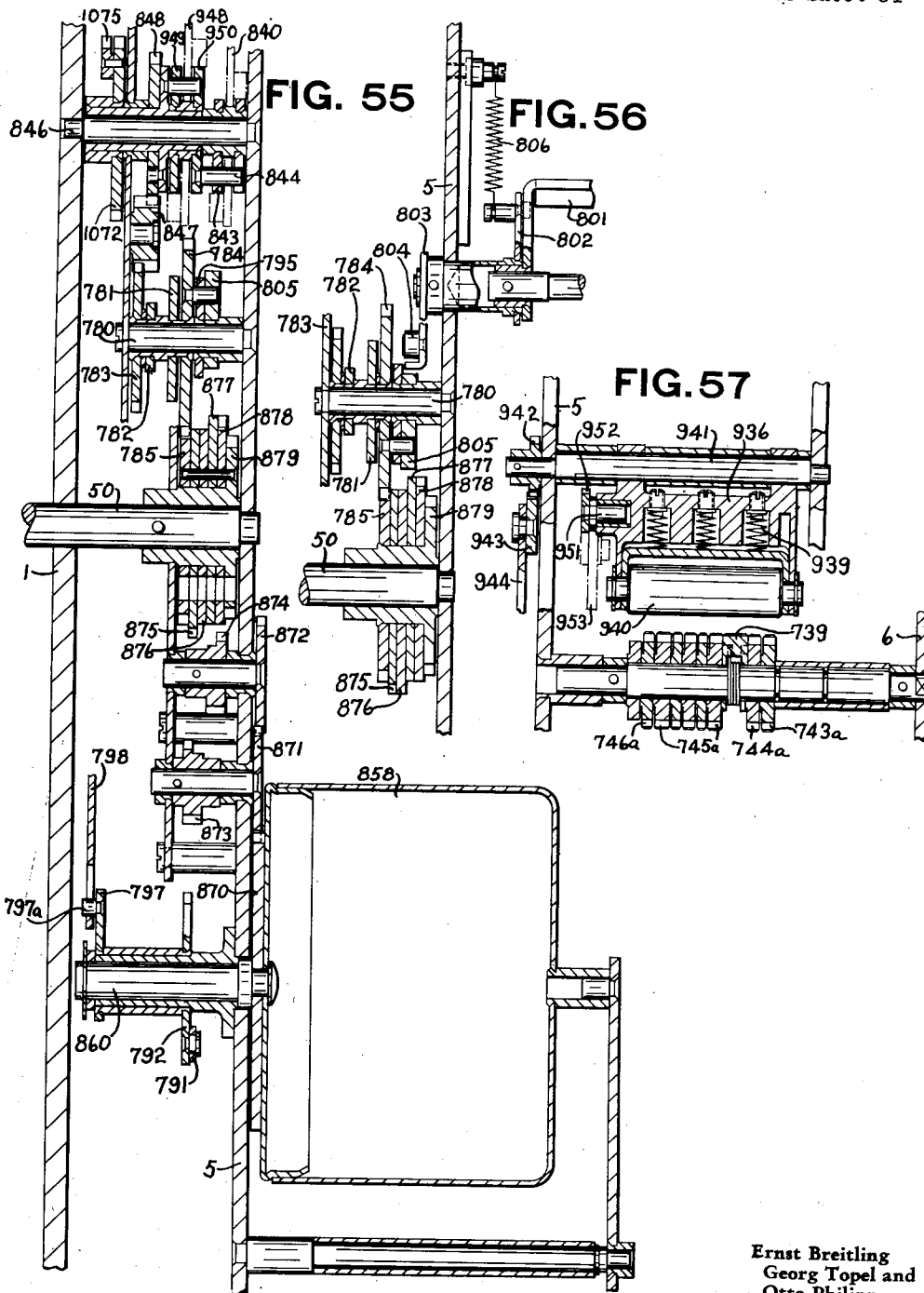
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Georg Topel and
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By *Heard Beust*
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FIG. 60

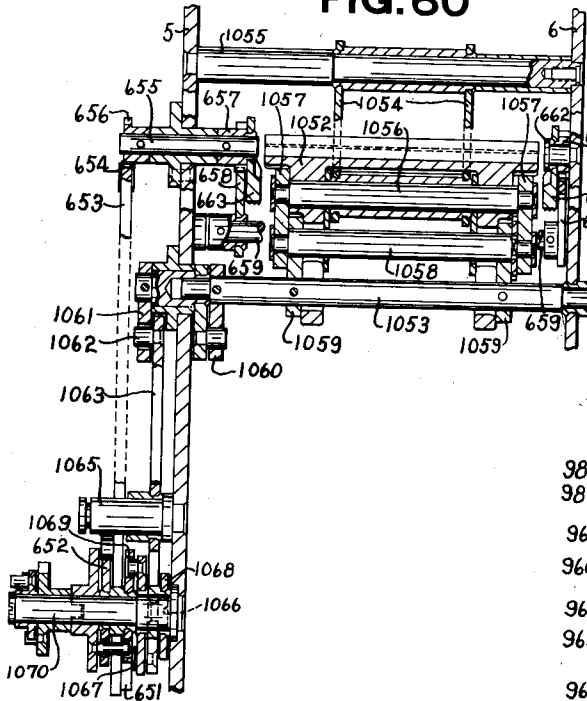


FIG. 58

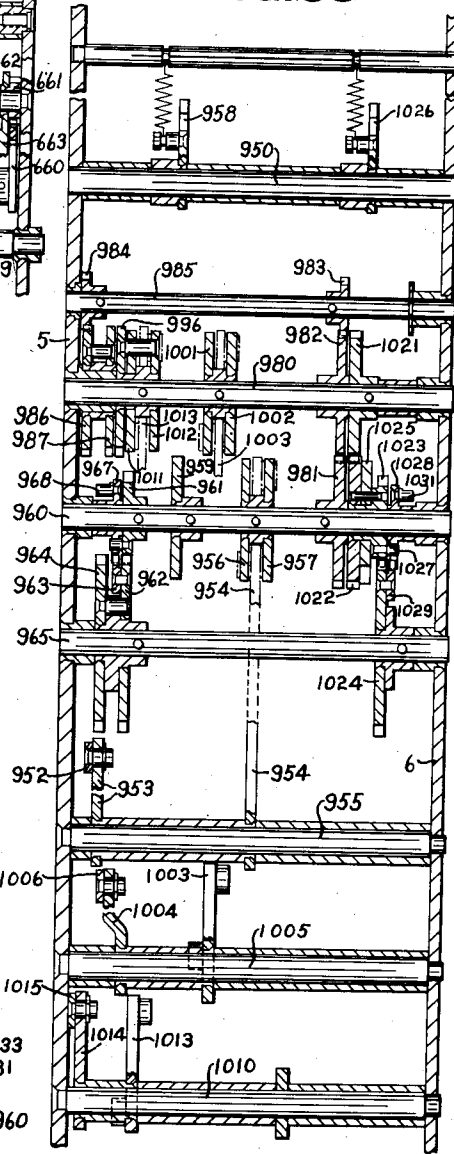
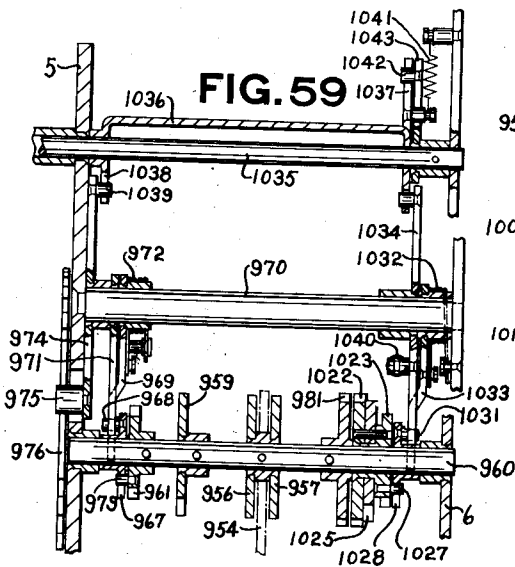


FIG. 59



Ernst Breitling
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Inventors

By *Heard Beust*
Their Attorney

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FIG. 61

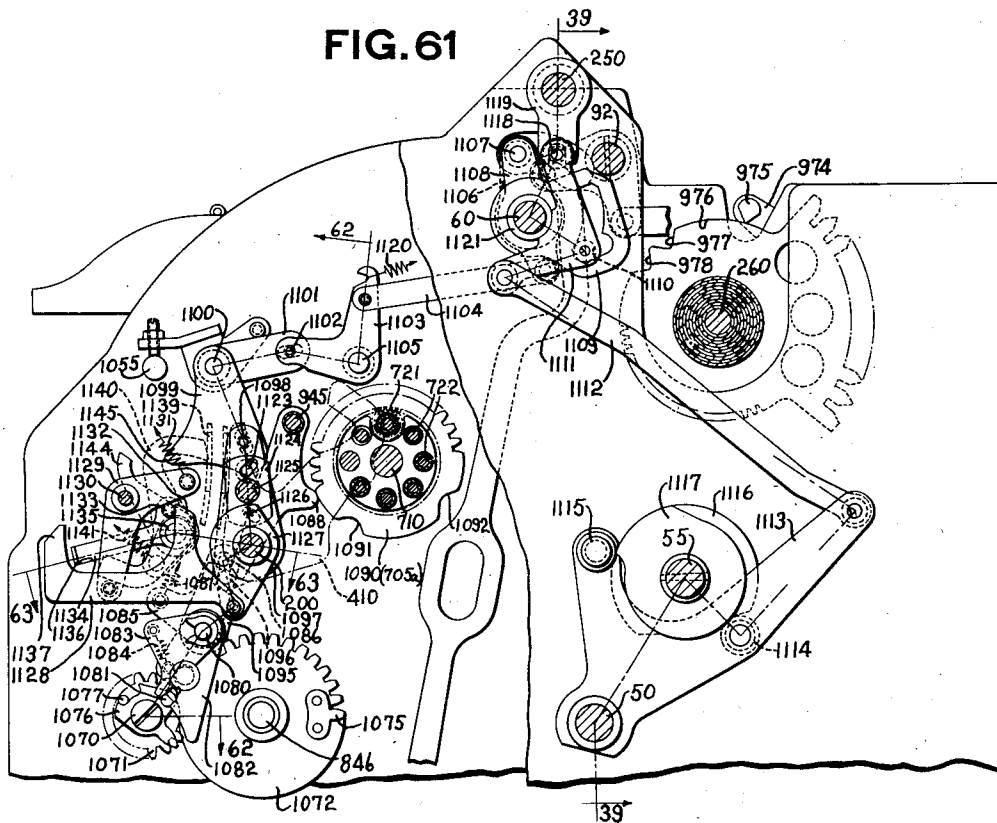


FIG. 74

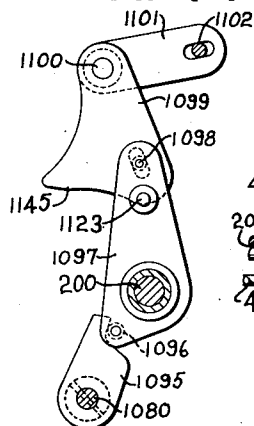


FIG. 63

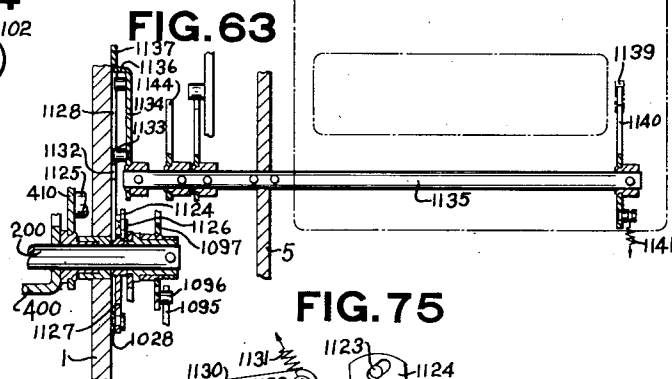
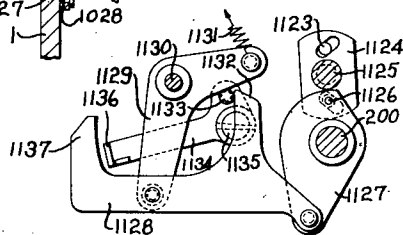


FIG. 75



**Ernst Breitling
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Otto Philipp
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By Charles Benoit
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FIG. 73

0343	D	•0,000.56	•0
0344	K	•0,005.55	•1
0345	F	•0,001.40	•2
	H	•0,001.20	•3
	T	•0,000.75	•4
	V	•0,002.30	•5
	N	•0,007.50	•6
0346	←	•0,011.75	•7
	K	•0,005.40	•8
	T	•0,001.37	•9
	S	•0,003.21	•0
0347	←	•0,009.98	•1
	K	•0,000.45	•2
	D	•0,000.80	•3
	S	•0,000.56	•4
	H	•0,001.60	•5
0348	←	•0,003.41	•6
	←	•0,075.31	•X
0349	←	•0,000.00	•0
0350	←	•0,000.90	•C
0351	←	•0,020.38	•P
0352	←	•0,000.90	•A
	←	•0,075.31	•Z

FIG. 71

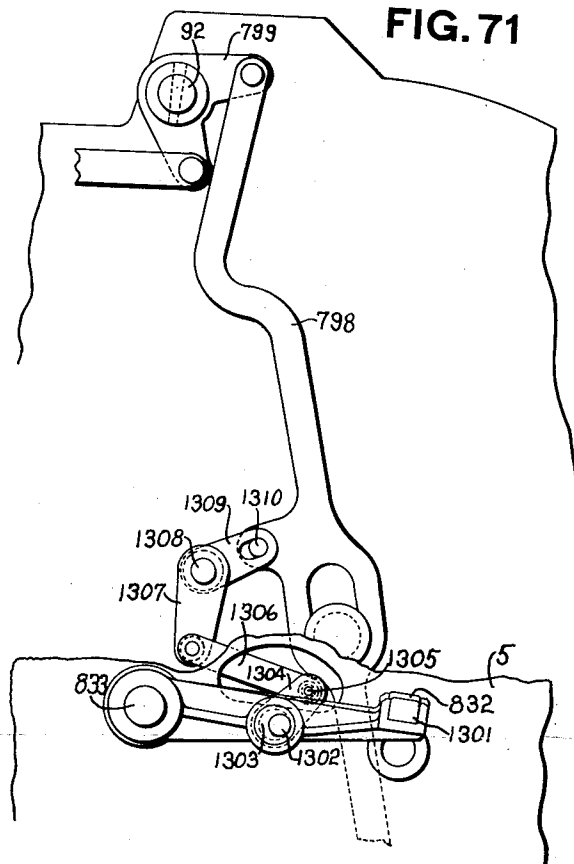
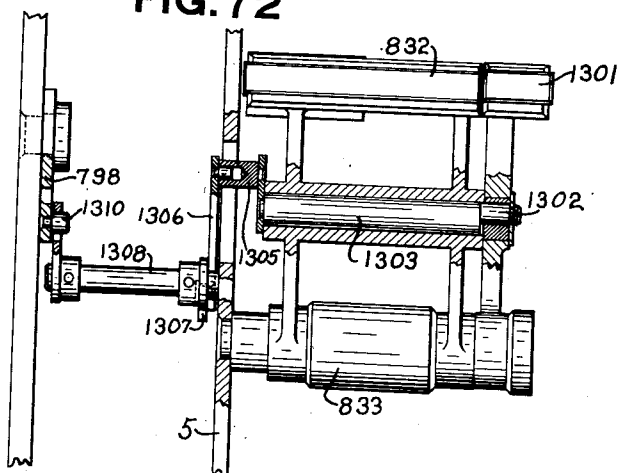


FIG. 72



Ernst Breitling
Georg Topel and
Otto Philipp
Inventors

By *Heard Beust*
Their Attorney

April 14, 1942.

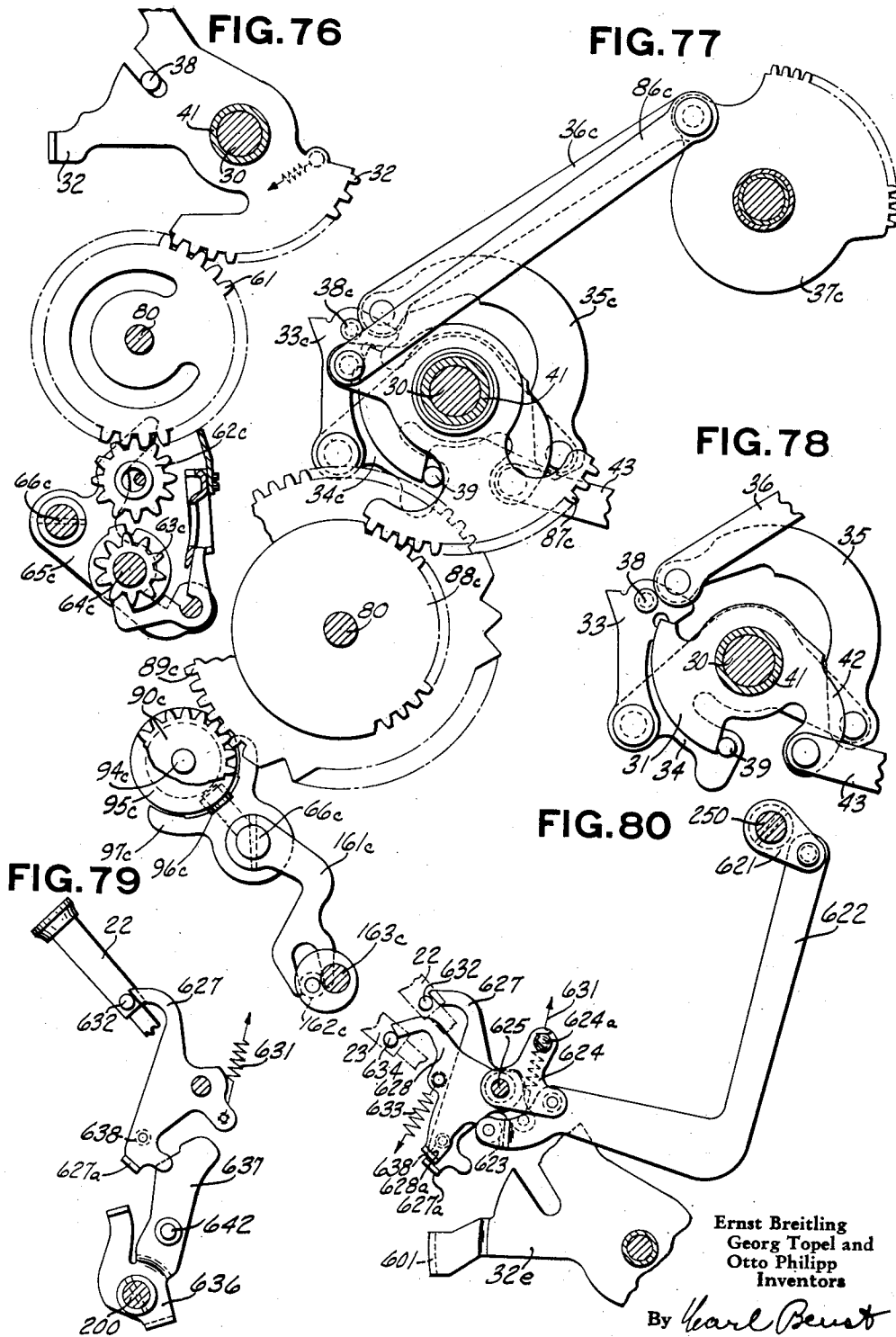
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FIG. 81

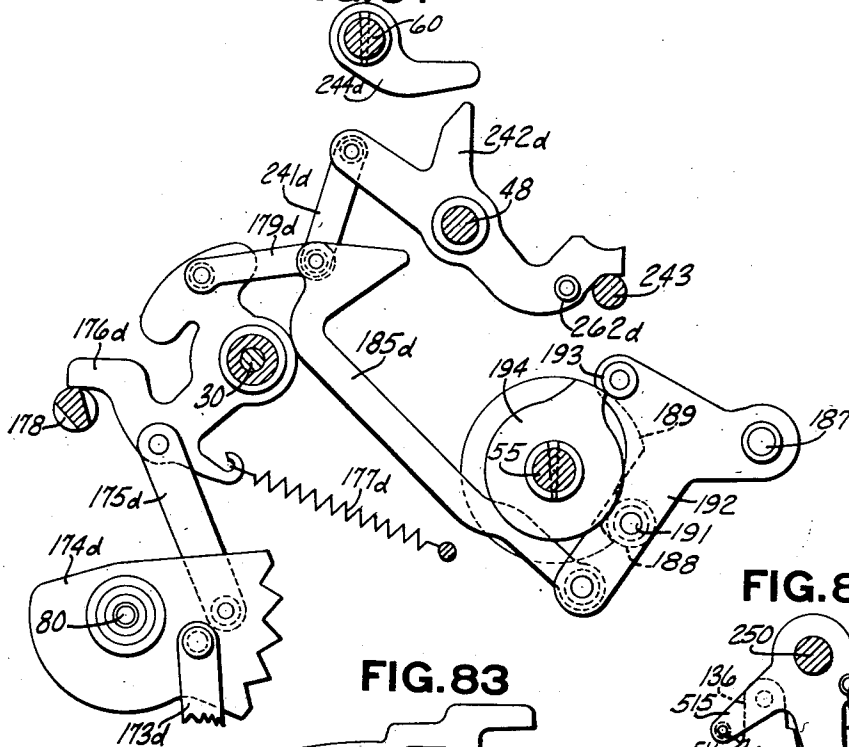


FIG. 83

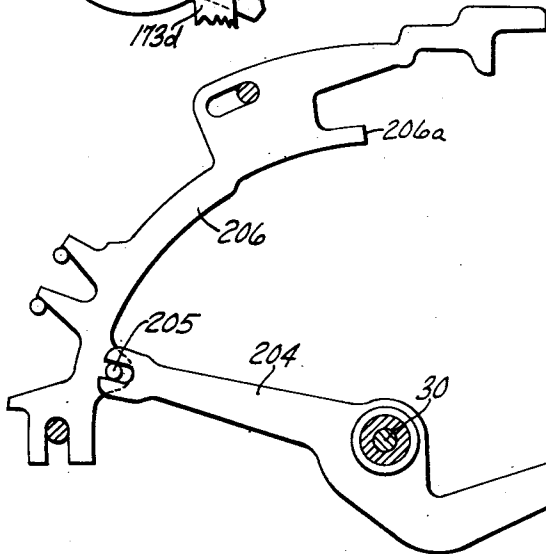
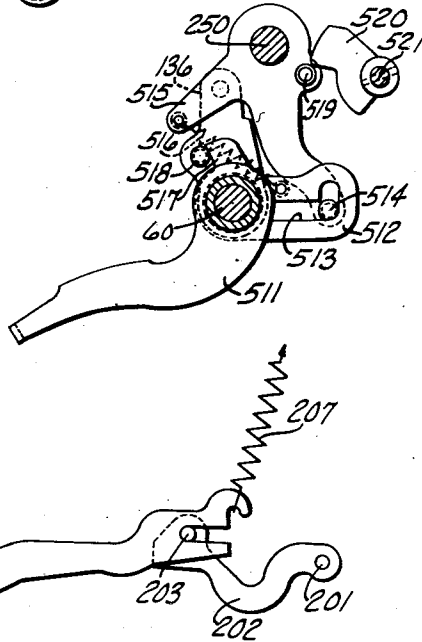


FIG. 82



Ernst Breitling
Georg Topel and
Otto Philipp
Inventors

By *Karl Benoit*
Their Attorney

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FIG. 84

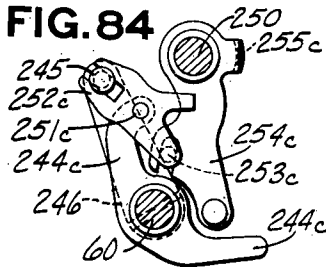


FIG. 85

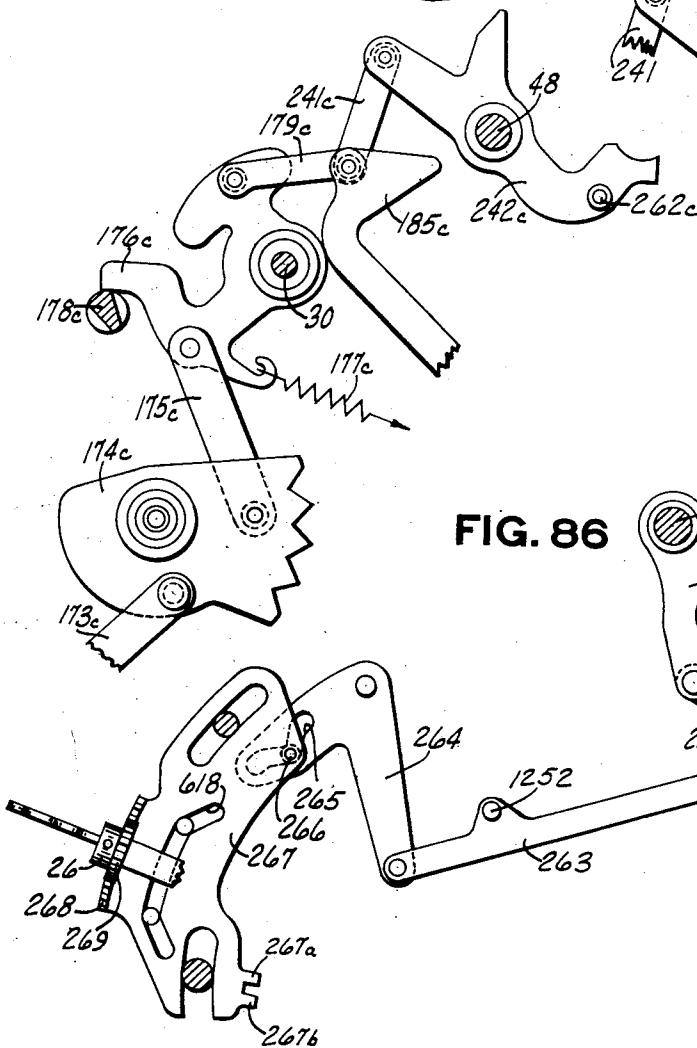
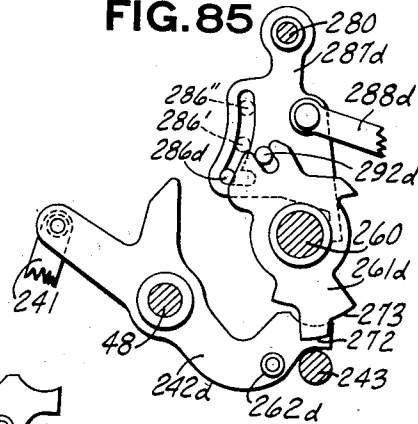
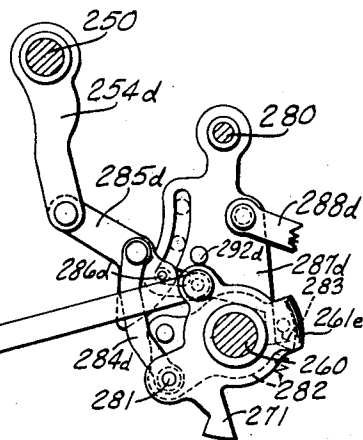


FIG. 86



Ernst Breitling
Georg Topel and
Otto Philipp
Inventors

By *Karl Benit*
Their Attorney

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FIG. 87

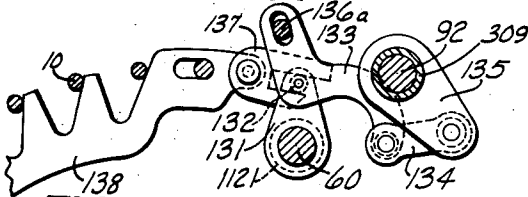


FIG. 88

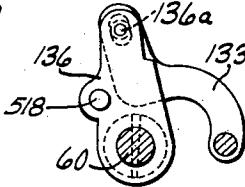


FIG. 89

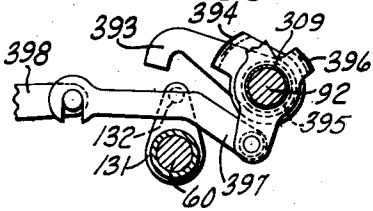


FIG. 90

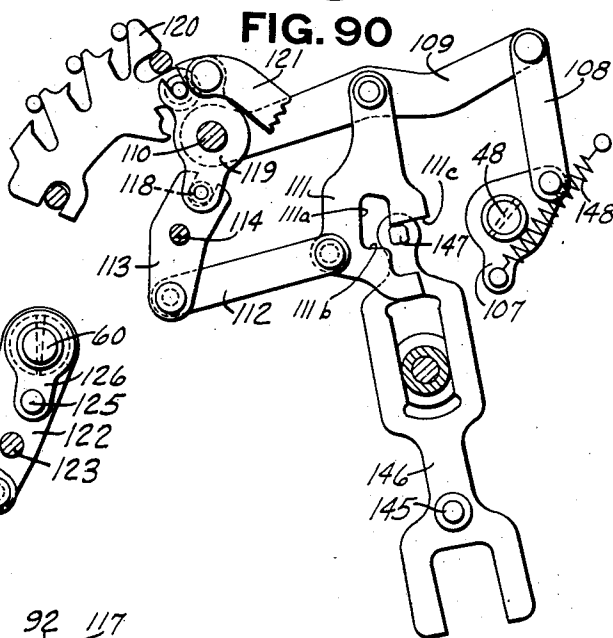


FIG. 91

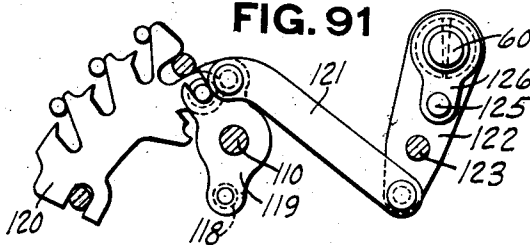


FIG. 92

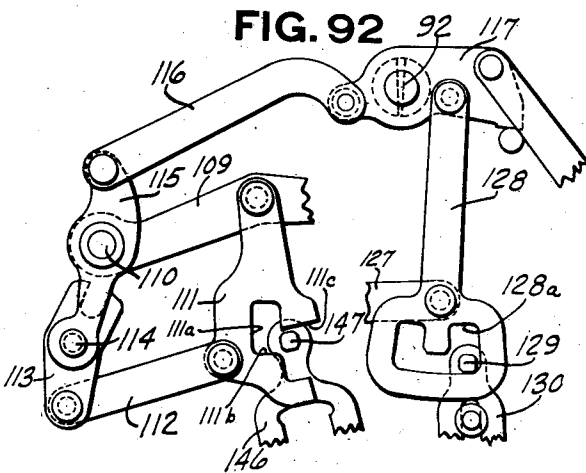
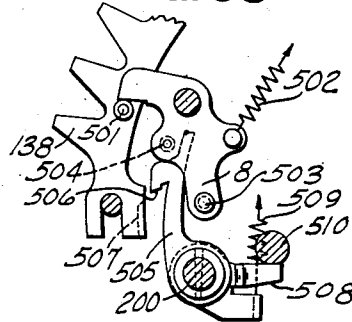


FIG. 93



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April 14, 1942.

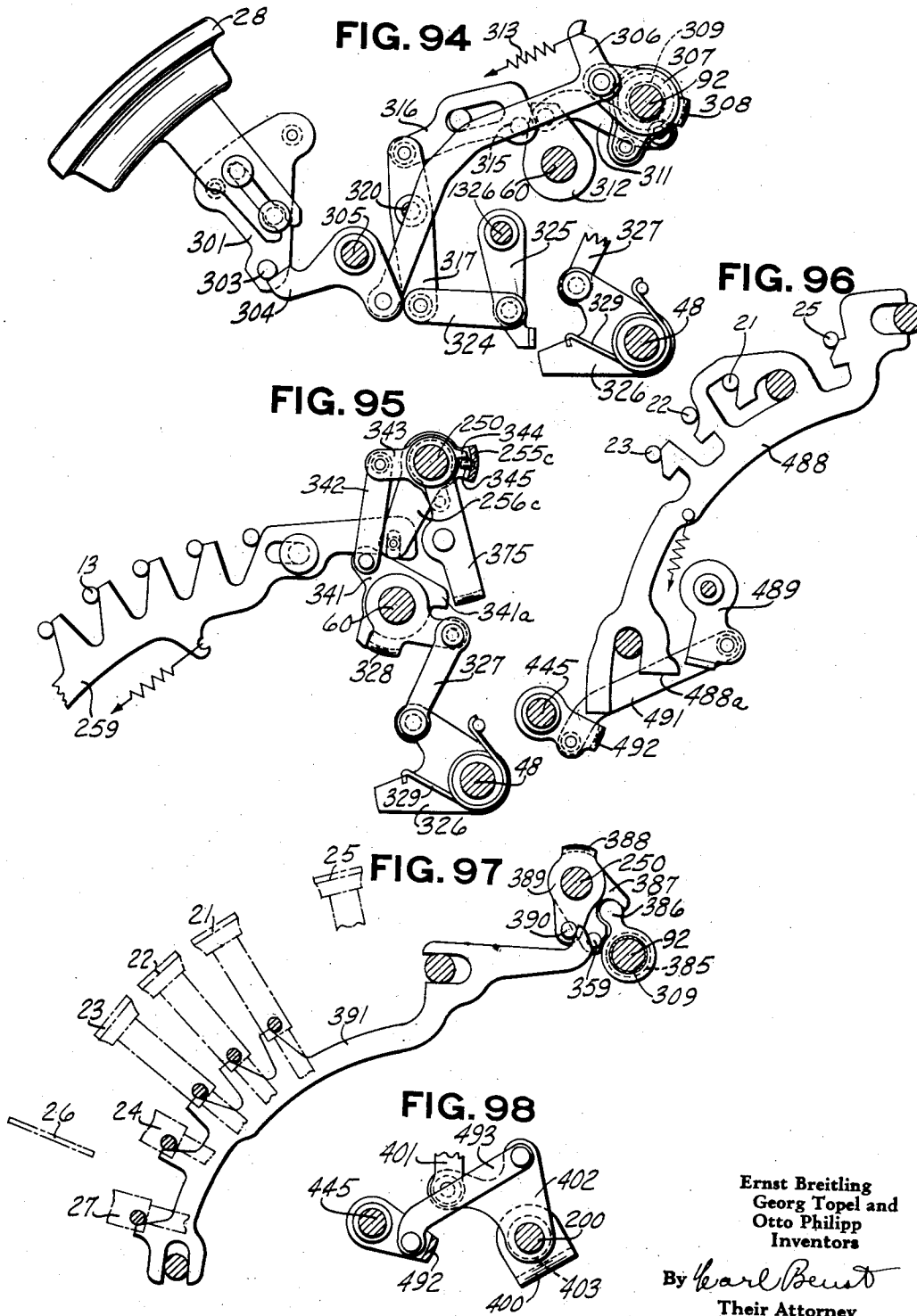
E. BREITLING ET AL

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CASH REGISTER

Filed Nov. 3, 1938

49 Sheets—Sheet 40



April 14, 1942.

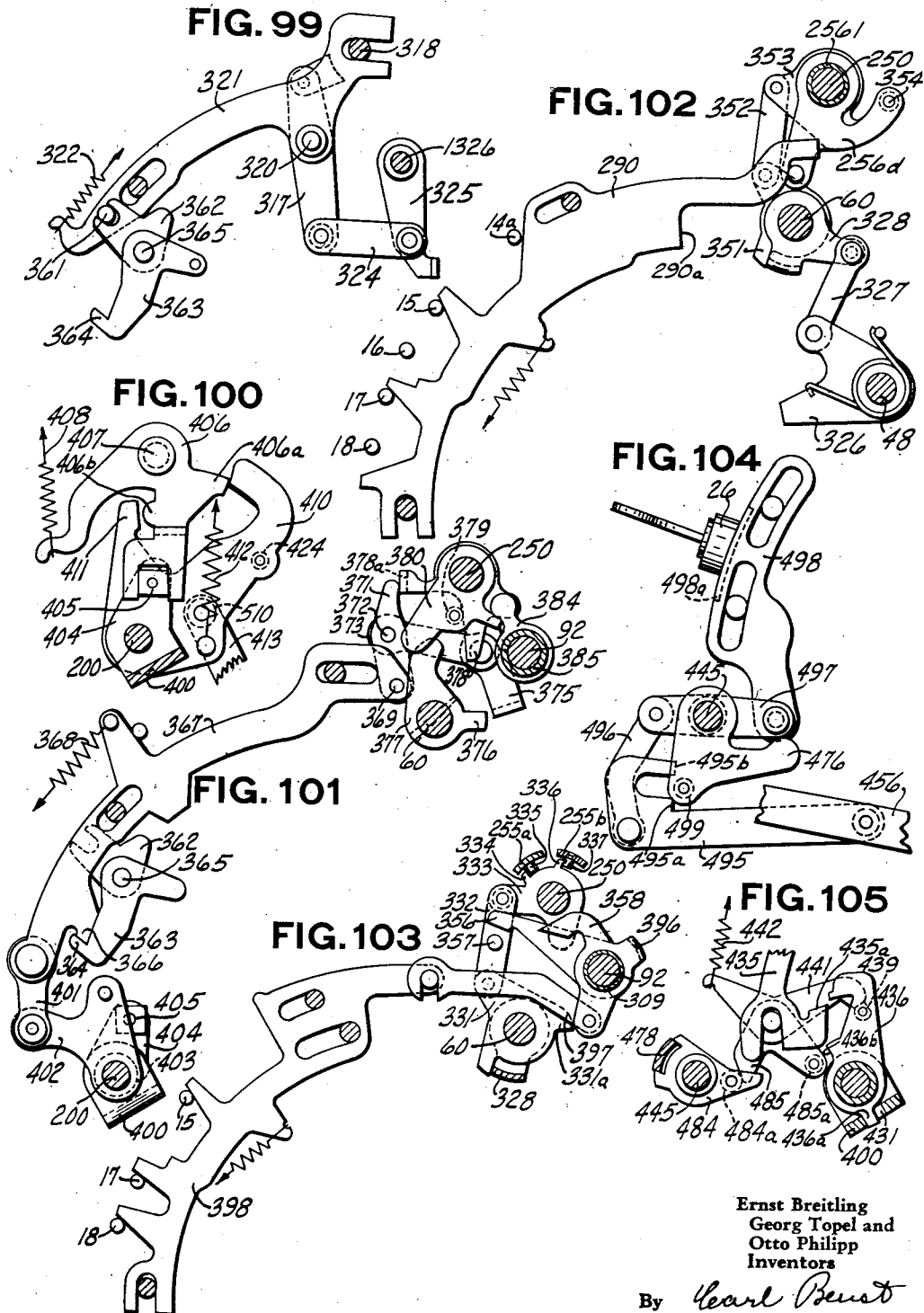
E. BREITLING ET AL

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CASH REGISTER

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49 Sheets-Sheet 41



April 14, 1942.

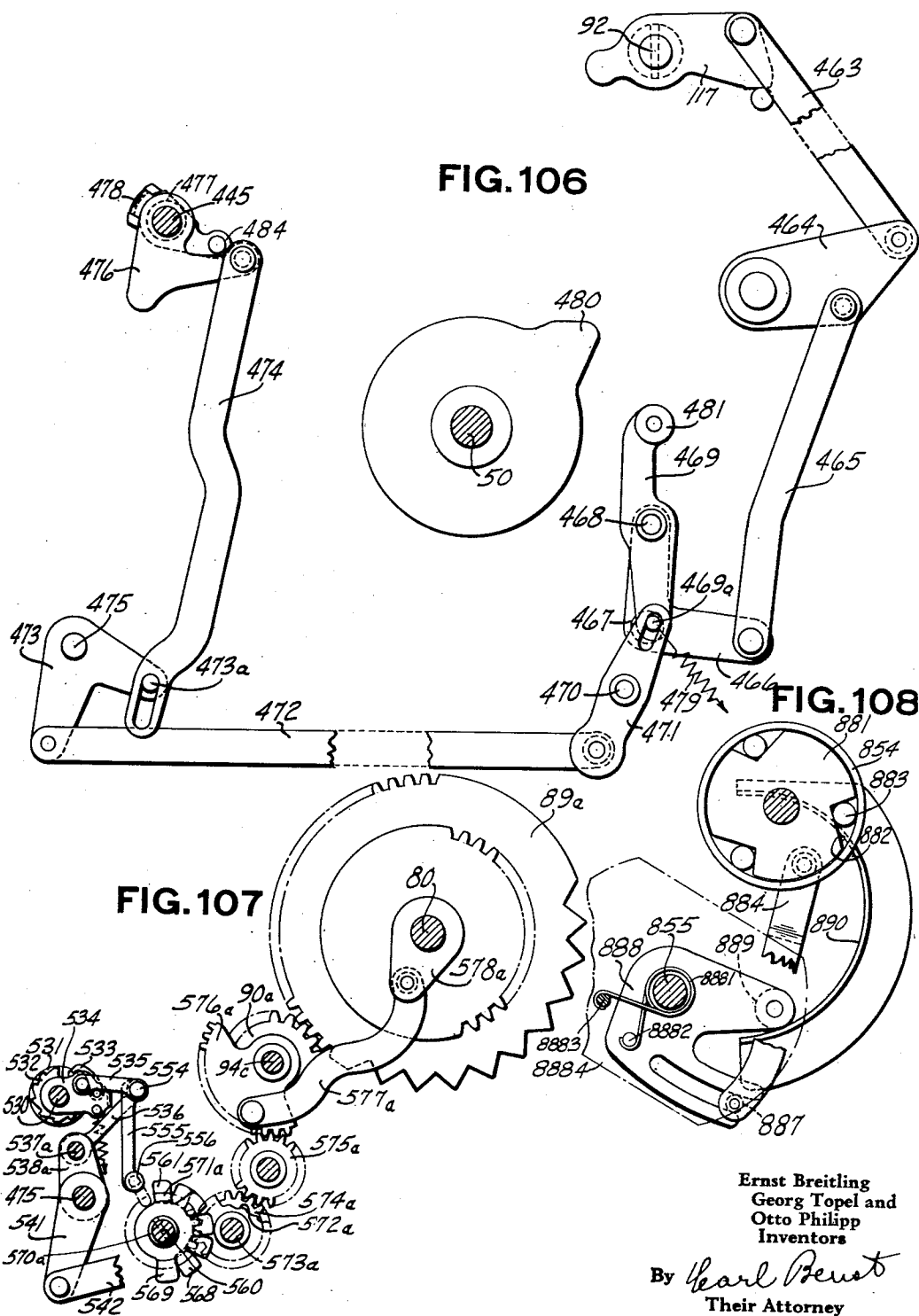
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CASH REGISTER

Filed Nov. 3, 1938

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April 14, 1942.

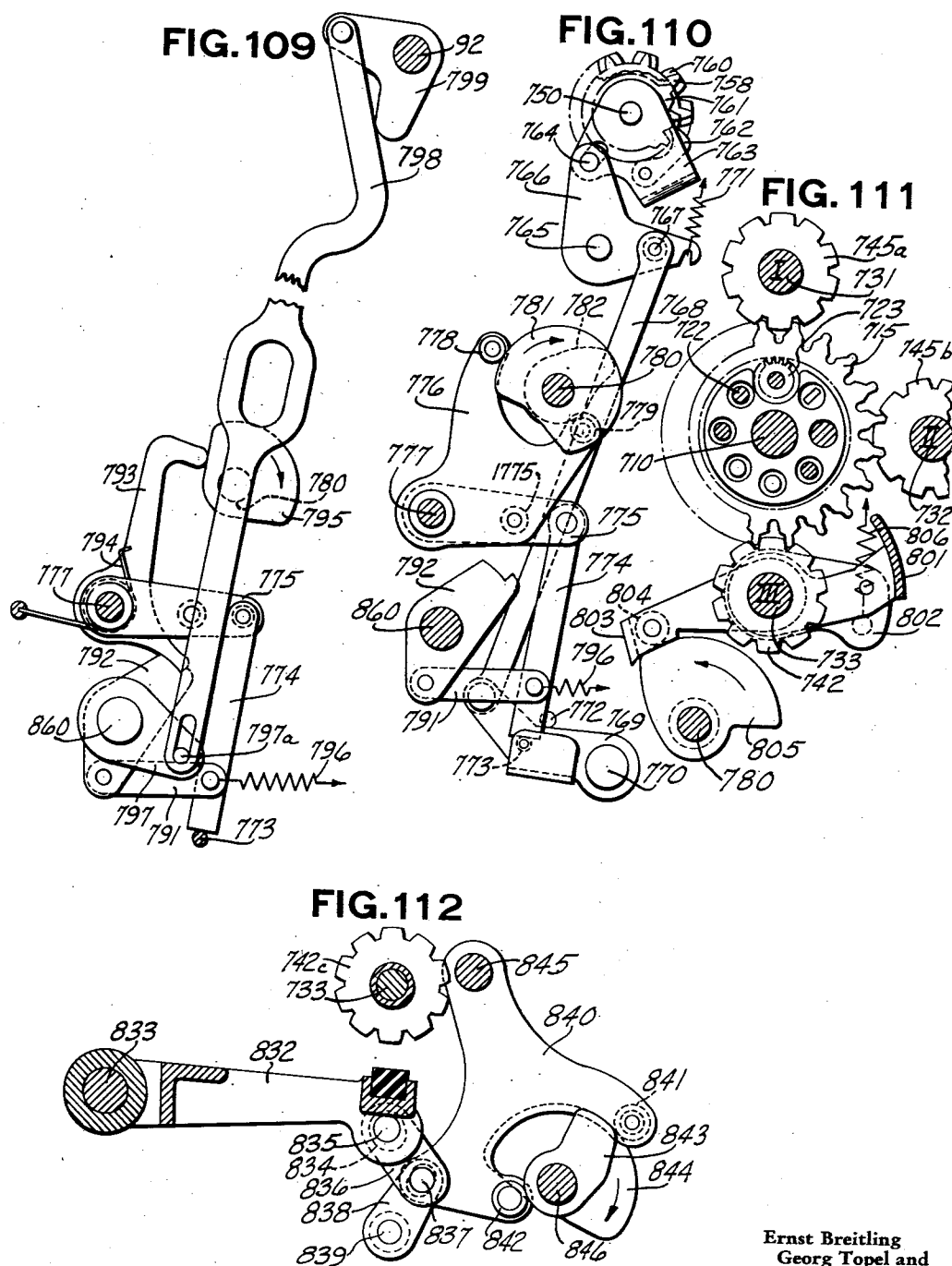
E. BREITLING ET AL

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CASH REGISTER

Filed Nov. 3, 1938

49 Sheets-Sheet 43



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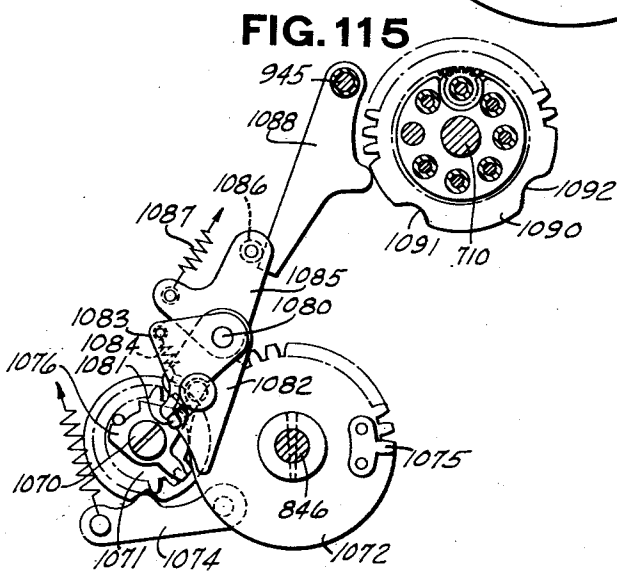
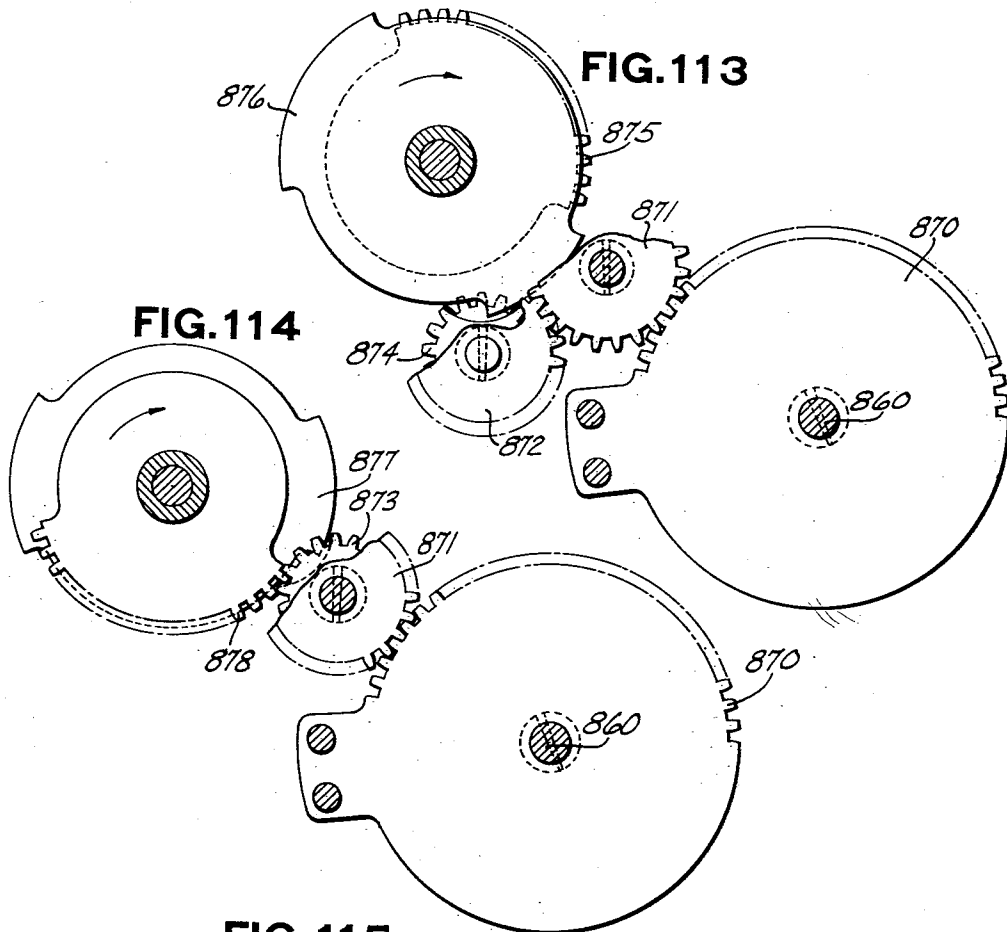
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CASH REGISTER

Filed Nov. 3, 1938

49 Sheets-Sheet 44



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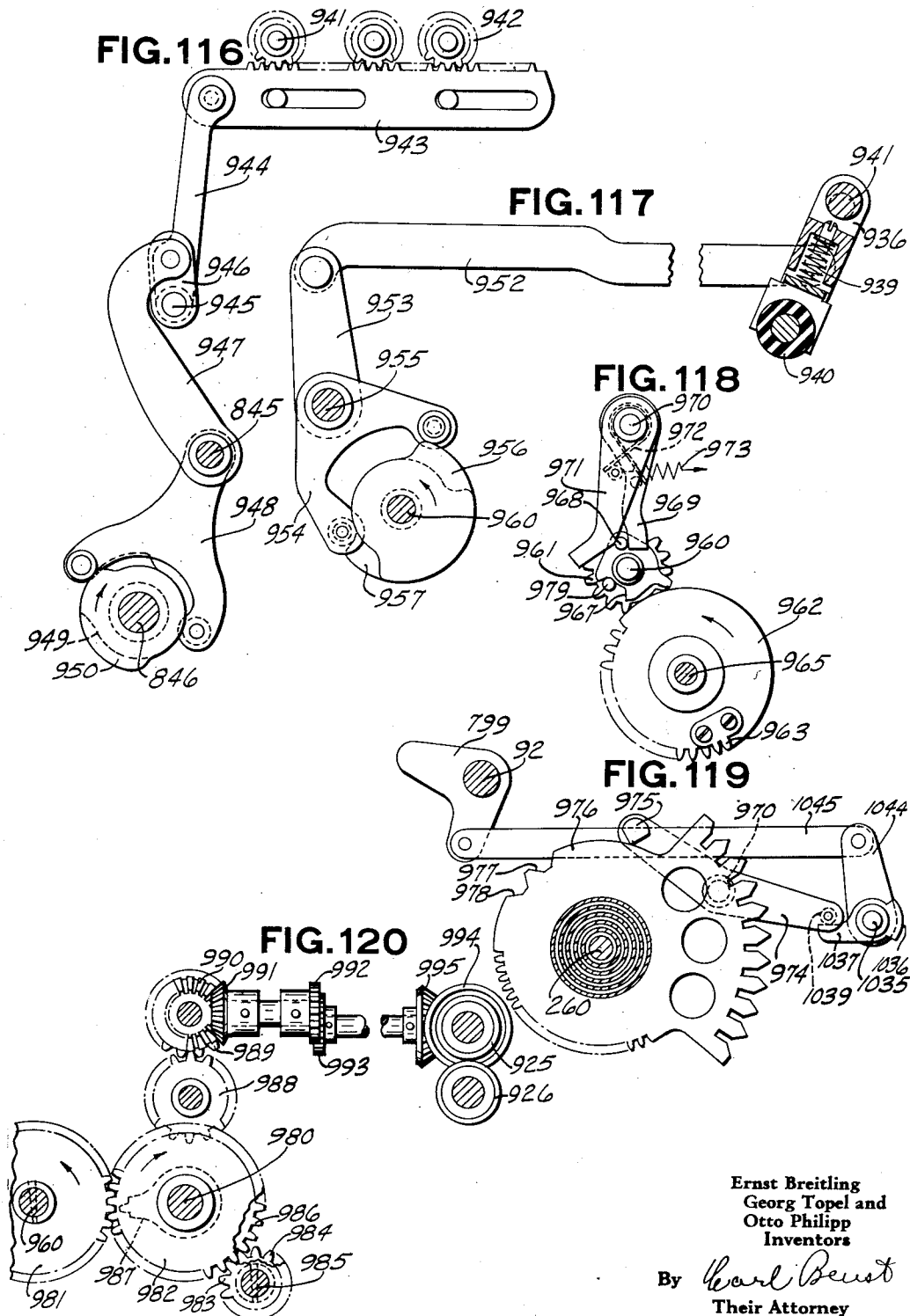
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49 Sheets-Sheet 45



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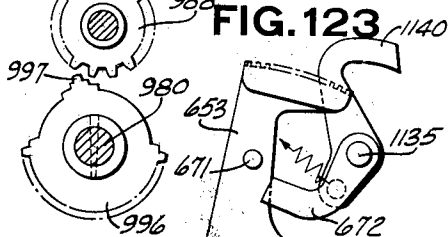
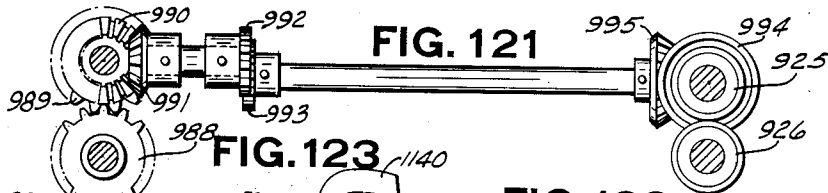


FIG. 122

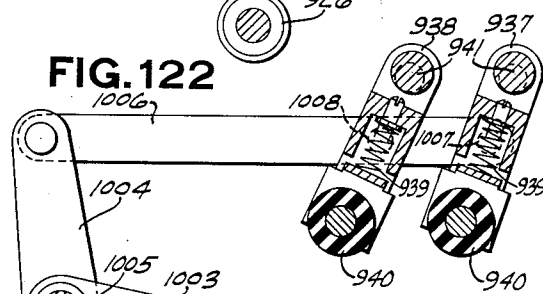


FIG. 124

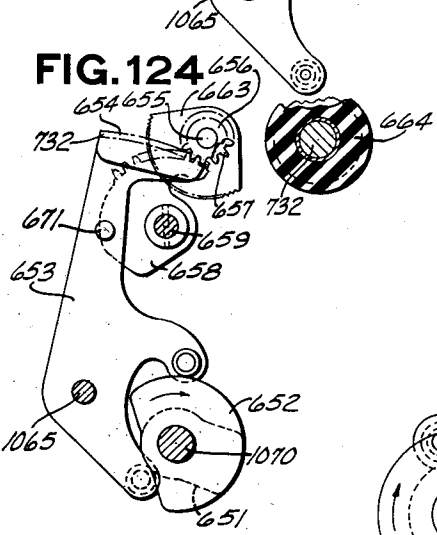


FIG. 126

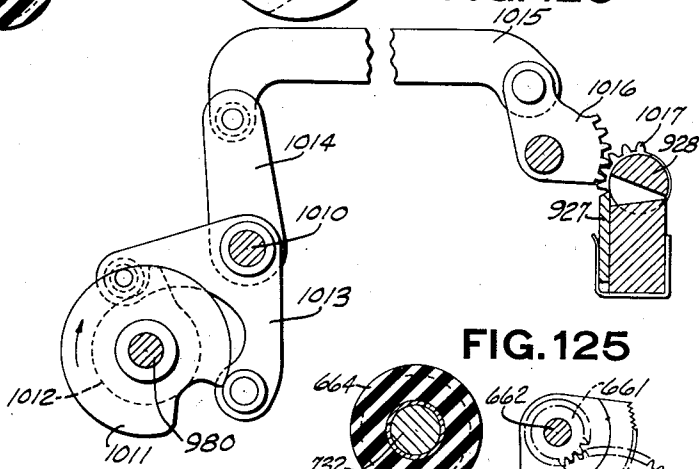


FIG. 125

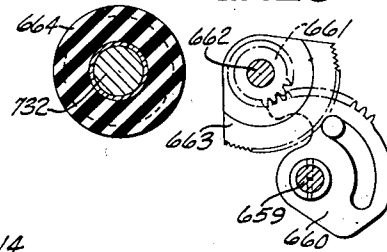
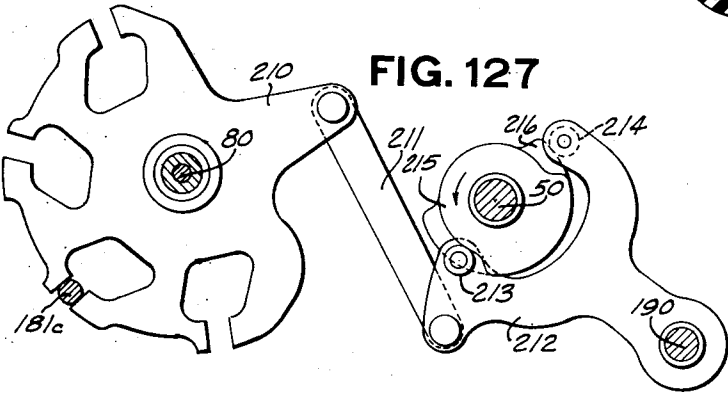


FIG. 127



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E. BREITLING ET AL

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FIG. 128

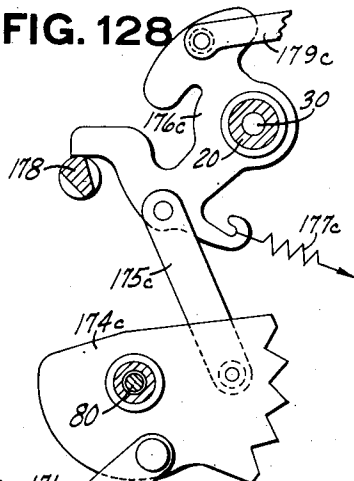


FIG. 129

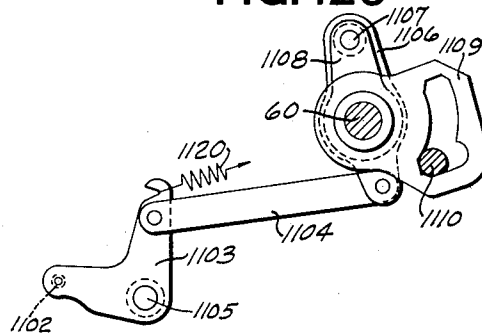


FIG. 131

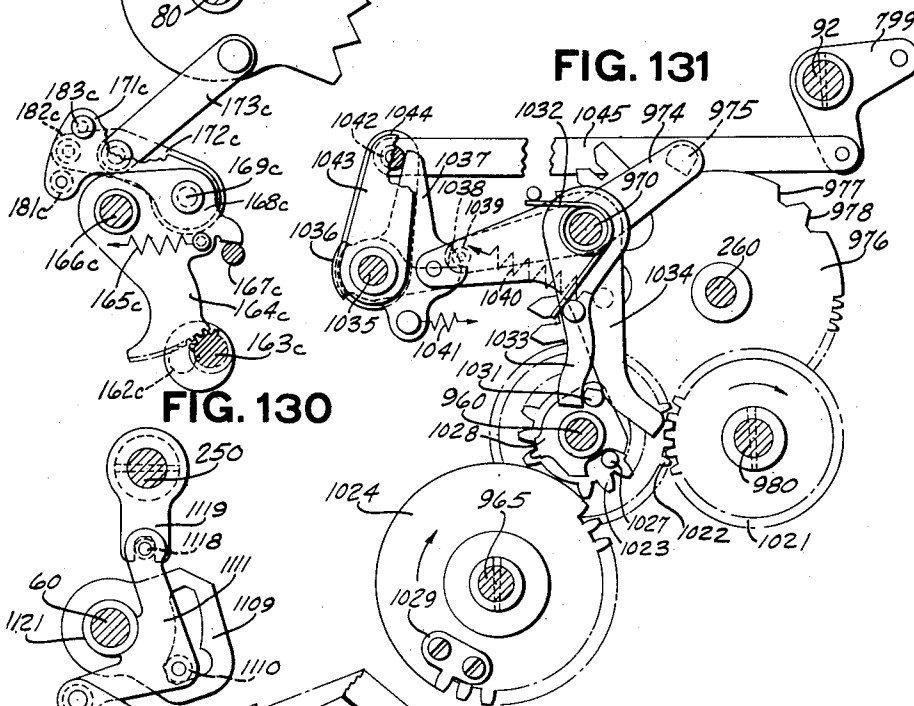
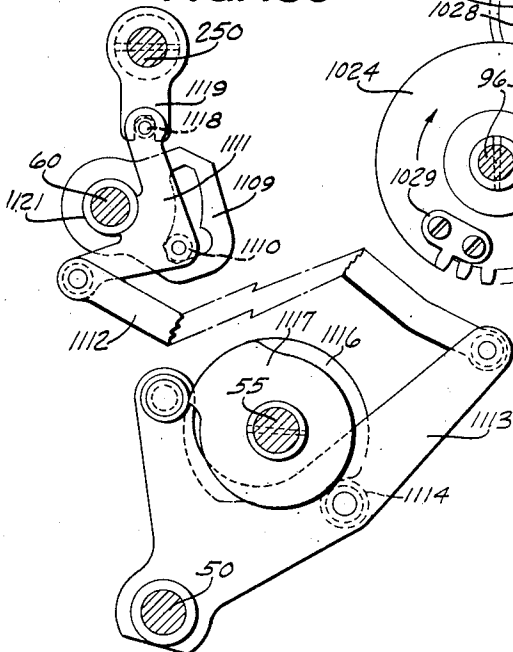


FIG. 130



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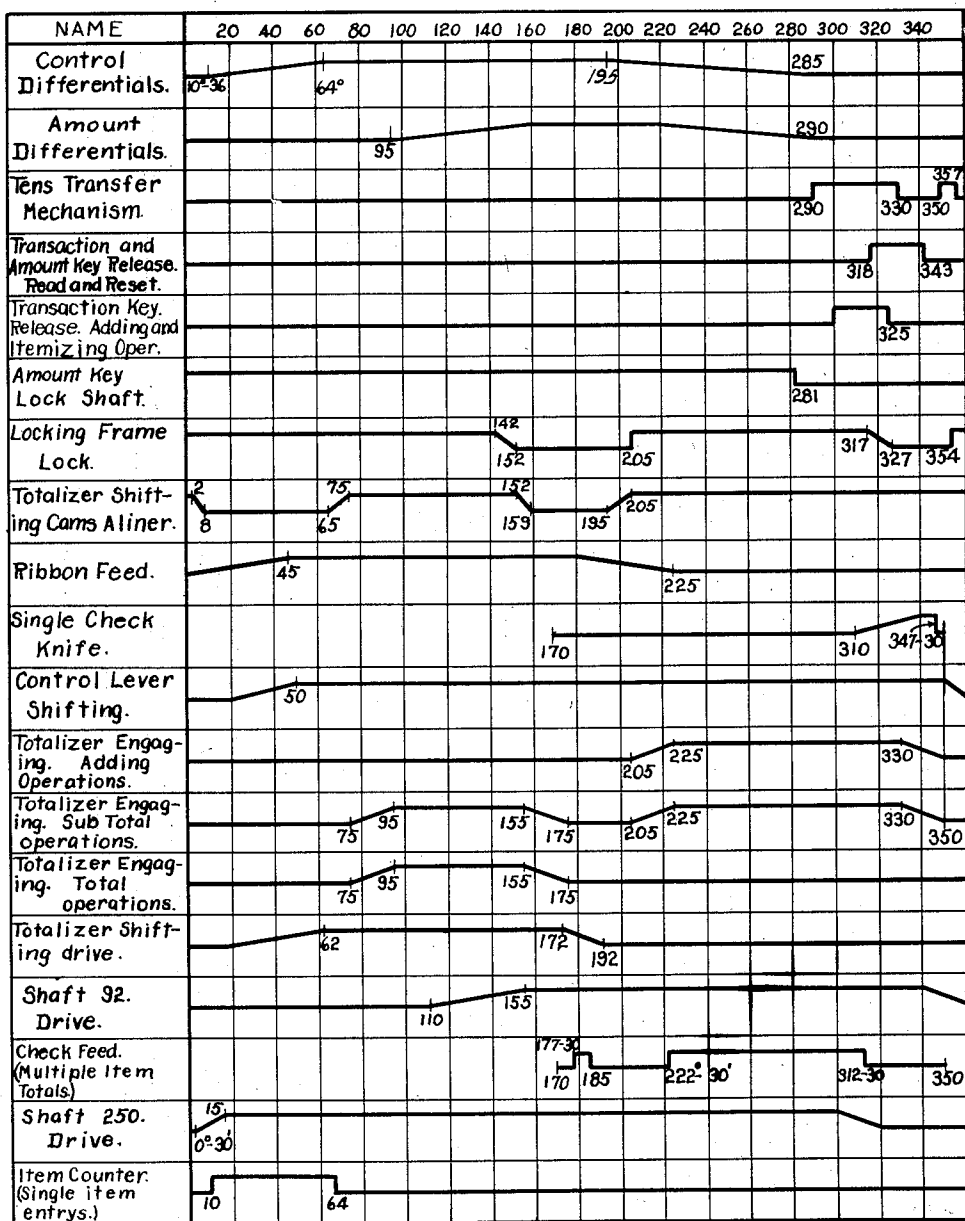
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FIG. 132



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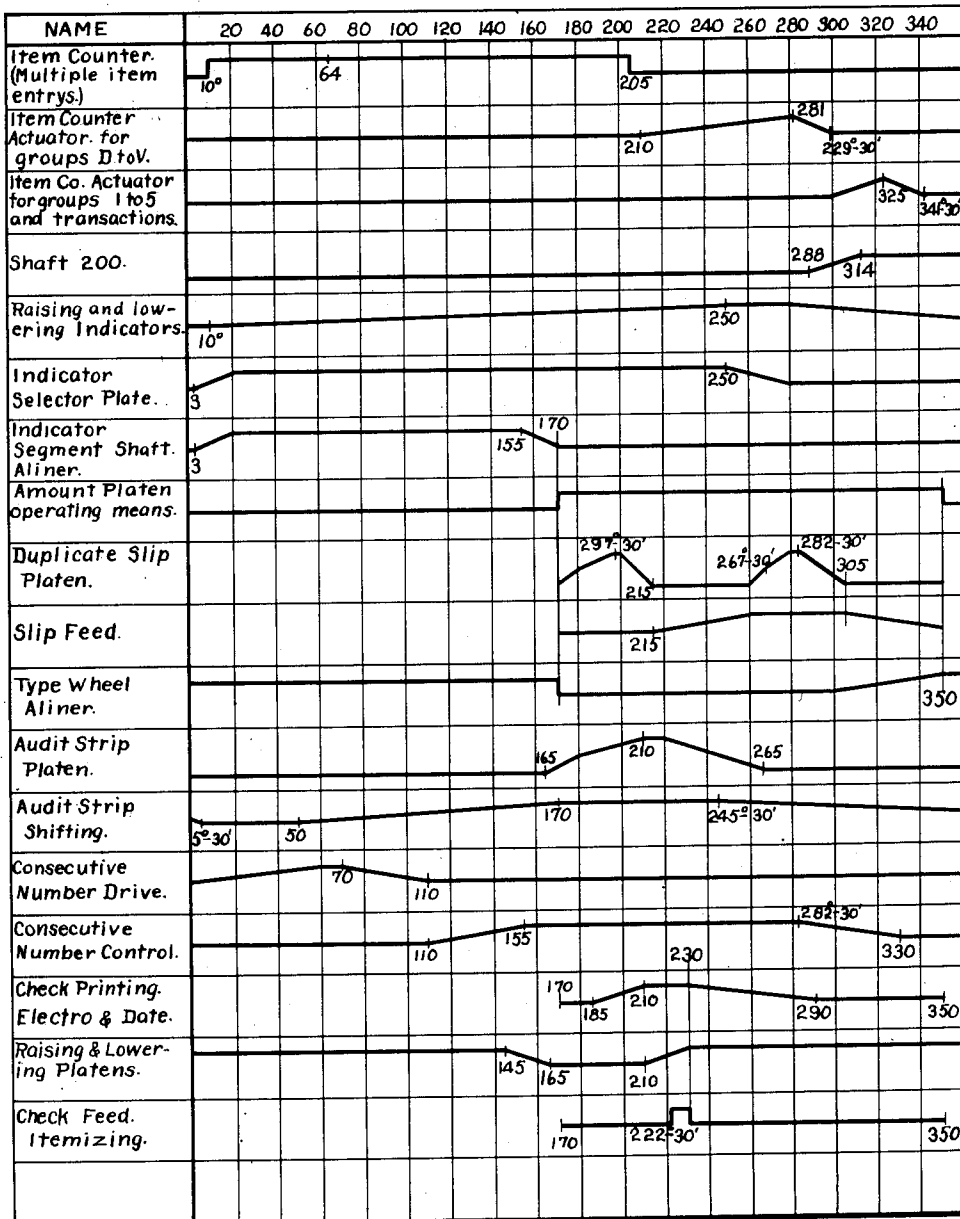
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FIG. 133



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UNITED STATES PATENT OFFICE

2,279,858

CASH REGISTER

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Application November 3, 1938, Serial No. 238,546
In Germany November 19, 1937

35 Claims. (Cl. 235—3)

This invention relates to printing mechanism for issuing single-item and multiple-item checks and slips.

The object of the invention is to provide novel controls for automatically printing and issuing single-item and multiple-item receipts.

The novel controls are so arranged that the printing and issuing of checks or slips are under the joint control of a control bank of keys, of the amount keys, and of a slip feeler which feels for the presence or absence of a slip in the slip receptacle.

The printing mechanism is so constructed and controlled that no check is printed or issued when a slip is printed upon, and the means to prevent issuing a check is controlled by a slip feeler.

A specific object of the invention is to control the operation of a plurality of printing platens in such a manner that only one platen is operated when an amount key is depressed in combination with a multiple-item control key, and all of the platens are operated when a multiple-item control key is depressed without depressing an amount key.

Another object of the invention is to control the plurality of printing platens to operate in unison when one or more amount keys are depressed without depressing a multiple-item control key.

It is also an object of the invention to control the check-feeding mechanism to cause a short feed when only one of said platens operates and a long feed when all of said platens operate.

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

Of the drawings—

Fig. 1 is a perspective view of the machine,
Fig. 2 is a cross-section of the machine showing the amount differential device, totalizer rows and indicating device,

Fig. 3 is a section through a totalizer row and the tens carrying mechanism along line 3—3 of Fig. 2,

Fig. 4 is a cross-section of the mode of operation control and totalizer engaging devices,

Fig. 5 is a cross-section of the totalizer selecting device,

Fig. 6 is a section of the totalizer selecting device along line 6—6 of Fig. 5,

Fig. 7 is a cross-section of the multiple-item totalizer selecting device,

Figs. 8A and 8B taken together form a split view in cross-section of the selecting and engaging devices for the totalizer row IV along line 8—8 of Fig. 4,

Fig. 9 is a cross-section of the machine showing a number of special actuating means for the control shafts,

Fig. 10 is a section along line 10—10 of Fig. 9,

Fig. 11 is a section along line 11—11 of Fig. 9,

Fig. 12 is a section along line 12—12 of Fig. 4,

Fig. 13 is a section along line 13—13 of Fig. 4,

Fig. 14 is a side view from the left of an amount key bank,

Fig. 15 is a cross-section showing the actuating device for the upper control shaft,

Figs. 16, 17 and 18 are detail diagrammatic views showing developments of the cam grooves in the totalizer selecting drum cams,

Fig. 19 is a detail sectional view of a part of the mode of operation control mechanism taken along line 19—19 of Fig. 4,

Fig. 20 is a detail sectional view of a part of the mode of operation control mechanism taken along line 20—20 of Fig. 4,

Fig. 21 is a side view of the control key bank and the total taking control lock,

Fig. 22 is a side view of the commodity key bank and the differential device controlled thereby,

Fig. 23 is a side view of the motor key bank and also showing the transaction counter and the release shaft drive,

Fig. 24 is a front view of the motor key bank and the transaction counter drive,

Fig. 25 is a cross-section of the machine release mechanism taken along line 25—25 of Figs. 28 and 32,

Fig. 26 shows a portion of Fig. 25 on enlarged scale,

Fig. 27 is a side view of the transaction key bank and a section of the upper control shafts along line 27—27 of Figs. 29, 30, and 31,

Fig. 28 is a sectional view of the lower control shaft and the release device,

Fig. 29 is a front view of the upper control shaft,

Fig. 30 is a front view of the rear control shaft,

Fig. 31 is a front view of the front control shaft,

Fig. 32 is a front view of the release shaft,

Fig. 33 is a side view of the control key bank,
Fig. 34 is a section along line 34—34 of Fig. 33.

Fig. 35 is a front view, partially in section, of the transaction counter row,

Fig. 36 shows a cam groove drum evolved,

Fig. 37 is a front view of the release shaft drive,

Fig. 38 is a front view of the transaction counter drive,

Fig. 39 is a section along line 39—39 of Fig. 61,

Figs. 40 and 41 show diagrammatically the control device,

Fig. 42 is a front view of the indicating device,

Fig. 43 is a top view of the indicating device, partially in section,

Fig. 44 is the indicating device viewed from the right,

Fig. 45 is a detail view of a part of the indicator mechanism,

Figs. 46A and 46B together form a cross-sectional view of the printing mechanism,

Fig. 47 is a detail sectional view of the audit strip printer,

Fig. 48 is a detail view in cross-section showing certain elements of the type wheel adjusting mechanism,

Fig. 49 is a detail view of the month type wheels showing the type engraved thereon,

Fig. 50 is a sectional view of the type wheel setting mechanism taken along line 50—50 of Fig. 48,

Fig. 51 is a sectional view of the type wheel setting mechanism taken along line 51—51 of Fig. 46A.

Figs. 52 and 53 show details of certain mechanism of Fig. 51 along the lines 52—52 and 53—53 of Fig. 51, respectively,

Fig. 54 is a side view showing the printing drive mechanism,

Fig. 55 is a sectional view of the actuating mechanism taken along line 55—55 of Fig. 54,

Fig. 56 is a detail sectional view of the actuator taken along line 56—56 of Fig. 46A.

Fig. 57 is a detail sectional view of an oscillating hammer for the check printer taken along line 57—57 of Fig. 46A,

Fig. 58 is a sectional view of the actuator of the check printer taken along line 58—58 of Fig. 46A,

Fig. 59 is a sectional view of the actuator for the check printer taken along line 59—59 of Fig. 46A,

Fig. 60 is a sectional view of the slip printer taken along line 60—60 of Fig. 46B,

Fig. 61 is a side view of the slip printer drive mechanism,

Fig. 62 is a sectional view of the slip printer drive taken along line 62—62 of Fig. 61,

Fig. 63 is a sectional view of the slip feeling device taken along line 63—63 of Fig. 61,

Fig. 64 is a facsimile of a portion of the audit strip,

Fig. 65 is a facsimile of a single-item transaction check,

Fig. 66 is a facsimile of an itemized check,

Fig. 67 is a facsimile of a single-item transaction slip,

Fig. 68 is a facsimile of an itemized slip,

Fig. 69 is a facsimile of a receipt slip covering an individual item belonging to a multiple-item transaction,

Fig. 70 is a detail view of some of the mechanism for throwing off the totalizer engaging

mechanism for the "clerks" totalizer row, shown in Fig. 4.

Fig. 71 is a modified form of consecutive numbering throw off mechanism.

Fig. 72 is a plan view of the mechanism shown in Fig. 71.

Fig. 73 is a facsimile of the detail strip produced by the machine when the throw off mechanism of Figs. 71 and 72 is provided in the machine.

Fig. 74 is a detail view of some of the parts shown in Fig. 61.

Fig. 75 is a detail view of some of the parts shown in Fig. 61.

Fig. 76 is a detail view of the connections between the differential actuator and the clerk's totalizer wheels, shown in Fig. 2.

Fig. 77 is a detail illustrating the totalizer row shifting mechanism for one of the rows of totalizers disclosed in Fig. 5.

Fig. 78 is a detail view showing the driving connections for the amount differential shown in Fig. 2.

Fig. 79 is a detail view of some of the parts shown in Fig. 33.

Fig. 80 is a detail view of some of the parts shown in Fig. 33.

Fig. 81 is a detail view of the totalizer row selecting mechanism shown in Fig. 4.

Fig. 82 is a detail view of the means for controlling the special zero stop pawl for the commodity bank.

Fig. 83 is a detail view of certain elements of the clerk's totalizer throwout mechanism shown in Fig. 4.

Fig. 84 is a detail view showing certain elements of the clerk's totalizer row selecting mechanism shown in Fig. 4.

Fig. 85 is a detail view showing a part of the transaction totalizer row selecting mechanism, shown in Fig. 4.

Fig. 86 is a detail view of the read and reset control for the transaction totalizer row, shown in Fig. 4.

Figs. 87 and 88 are detail views of parts of the mechanism shown in Fig. 15, for controlling the selection of the multiple-item keys by the amount keys.

Fig. 89 is a detail view showing a part of the throwout mechanism of Fig. 27, which is under control of the no sale key.

Figs. 90, 91, and 92 are detail views of parts of the mechanism shown in Fig. 9.

Fig. 93 is a detail view of certain elements of Fig. 25, and shows the means for throwing out the zero stop pawls for total-taking operations.

Fig. 94 is a detail view of certain parts shown in Figs. 23 and 25, and shows the motor bar and some of the parts connected thereto for releasing the machine for operation.

Fig. 95 is a detail view of certain parts shown in Figs. 5 and 25.

Fig. 96 is a detail view of certain parts shown in Fig. 21, and illustrates the mechanism for maintaining the depressed multiple-item key locked until a total of the multiple-item transaction is printed.

Fig. 97 is a detail view of a part of the mechanism shown in Figs. 27 and 33.

Figs. 98, 99, 100, and 101 are detail views of parts of the release mechanism shown in Fig. 25.

Figs. 102 and 103 are detail views of control mechanisms disclosed in Figs. 4 and 25.

Fig. 104 is a detail view of a part of the mechanism disclosed in Fig. 23.

Fig. 105 is a detail view of certain parts of the interlocks shown in Fig. 5, for holding the clerk and transaction keys depressed during a series of entries of a multiple-item transaction and until the total of the multiple-item transaction is taken.

Fig. 106 is a detail view of certain parts of Fig. 23 for releasing the clerks' and transaction keys.

Fig. 107 is a detail view of the special counter control mechanism shown in Figs. 2 and 5.

Fig. 108 is a detail of a part of the audit strip feed mechanism shown in Fig. 46A.

Figs. 109 and 110 are detail views of the consecutive numbering mechanism and its controls, shown in Fig. 54.

Fig. 111 is a detail view of the type wheel aliners shown in Fig. 46A.

Fig. 112 is a detail view of the audit strip platen and its operating mechanism, shown in Fig. 46A.

Figs. 113 and 114 are detail views of the intermittent driving means for shifting the audit strip from visible position to printing position and back again, shown in Figs. 46A and 54.

Fig. 115 is a detail view of a part of the slip printing control mechanism shown in Fig. 54.

Fig. 116 is a detail view of the means for raising and lowering the check printing hammers, shown in Fig. 54.

Fig. 117 is a detail view of the printing hammer for printing the amounts on the check, together with the operating connections shown in Fig. 46A.

Fig. 118 is a detail view of the drive gears for the amount printing hammer shown in Fig. 46A.

Fig. 119 is a detail view of a part of the control means for determining when the check printer is to operate, shown in Fig. 54.

Fig. 120 is a detail view showing the means for giving the check strip a long feed, shown in Fig. 46A.

Fig. 121 is a detail view showing the means for giving the check strip a short feed.

Fig. 122 is a detail view showing the means for actuating the check data printing hammer, shown in Fig. 46A.

Fig. 123 is a detail view showing the means for withdrawing the slip feeler, shown in Fig. 54.

Figs. 124 and 125 are detail views of the slip feed means shown in Fig. 54.

Fig. 126 is a detail view of the check severing means shown in Fig. 46A.

Fig. 127 is a detail of a part of the means for engaging the totalizers in add timing.

Fig. 128 is a detail view of a part of the clerk's totalizer engaging means.

Figs. 129 and 130 are details of the slip printer control means, disclosed in Fig. 61.

Fig. 131 is a detail view of the means to control the operation of the check printing, issuing, and severing mechanisms.

Figs. 132 and 133 together constitute a time chart for the machine operating mechanisms.

The description is set out with reference to a machine for registering and printing single-item transactions and multiple-item transactions, the multiple-item-total thereof being computed in a special multiple-item totalizer and printed when resetting said multiple-item totalizer. Further, the amounts entered are analyzed according to the kind of goods, clerks, and transactions, and accumulated on totalizers from which sub-totals and totals can be taken and printed. The amounts entered are classified according to the kind of goods purchased, clerks and character of the transaction, and are counted by special

item counters. An item counter is also provided to compute the grand total of all customers served.

All registrations made by the machine, and the necessary data, are printed upon an audit strip. Either a single-item check, a multiple-item check, a double check having printed thereon a single-item transaction in duplicate, an item of a multiple-item transaction, or the total of a multiple-item transaction, or no check is issued by the machine.

To condition the machine for the various operations and printing, a setting up board is provided comprising amount and special keys which, by means of a series of locking mechanisms, are locked and released in such a way that the correct operation and working of the machine are ensured.

KEYBOARD

The keyboard of the machine (Fig. 1) comprises each commodity key having allotted thereto a totalizer. The totalizers allotted to the keys 11 are mounted in one row, forming the totalizer row I (Fig. 2), and those allotted to keys 12 are mounted in another row, forming the totalizer row II. Another bank 13 comprises clerk keys, each such key having allotted thereto a totalizer of totalizer row III. For recording the machine operations for the individual transactions, a bank of transaction keys 14 to 18 is provided. Each of the keys 15, 16, 17 for the transactions "Received on account," "Charge" and "Paid out" has allotted thereto a totalizer of row IV, key 18 ("No sale"), however, has no totalizer associated therewith.

No "Cash" key is provided, however, for entering "Cash" transactions. A "Cash" totalizer is provided in totalizer row IV, which totalizer is automatically selected when no transaction key 15 to 18 is depressed in a manner hereinafter described. To take the total of all cash transactions, this totalizer is selected upon depressing key 14.

To enter a multiple-item transaction, one of the three item-total keys 21, 22 or 23 is depressed, and upon depression of such key, a multiple-item totalizer, located in totalizer row IV, is selected to add thereon the individual items of the multiple-item transaction. Upon resetting the multiple-item totalizer, the multiple-item total is printed. Key 21 of these three keys causes the issue of an itemized check (Fig. 66). The keys 22 and 23 control the printing on inserted slips in such a manner that, when key 22 is depressed, for each individual item of a multiple-item transaction, the respective item is printed on the slip. When the total of a multiple-item transaction is taken, the total is not printed on the slip. When the key 23 is depressed, the multiple-item total is printed on the slip, but no printing takes place on the slip when the items of the multiple-item transaction are entered.

In addition to keys 21, 22 and 23 this key bank, called hereinafter "control bank," includes a key 25, depression of which disables the check printer when entering cash transactions; however, when entering "Received on account," "Charge" and "Paid out" transactions, checks are issued even though the key 25 is depressed. Also, a lock 26 is provided in this bank for conditioning the machine for "Reading" or "Sub-total taking" (X), and "Resetting" or "Total taking" (Z) respectively, operable upon the insertion of either of two special keys into lock 26 and turning said keys to the left or right.

A manual key release device 453 is provided for releasing any keys which were erroneously depressed, and a key 1889 is provided for line-spacing the audit strip.

The machine is released for operation upon depressing the motor, or release bar 28.

AMOUNT DIFFERENTIALS

Associated with each amount bank is a differential of a construction Figs. 2, 76, and 78 substantially like that disclosed in United States Patent No. 2,101,636, issued to Breitling and Schwenk on December 7, 1937. Briefly described, said differential consists of the actuator 31 mounted on a shaft 30, the main differential member 32, the coupling pawl 33 and the setting member 34, the latter being connected by a curved lever or beam 35 and a link 36, to a segment 37 serving as a means for setting up the appropriate indicator wheel and the type wheel hereinafter described.

The main differential member 32 associated with each amount key bank is, through an intermediate gear 61, constantly in mesh with four amount differential wheels 62a-d, with which the adding wheels 63 of the totalizers selected at the time, are selectively engaged, the adding wheels being interspersed on the totalizer shafts 64a-d.

The actuators 31, of all amount differential devices, are secured to a tube 41 mounted on the shaft 30. The actuator on each end of tube 41 has an arm 42, and said arms are connected by links 43 to arms 44. The arms 44 are supported by rod 45 and guided on blocks 46 rockable on shaft 48. The rod 45 is supported by two levers 47 carrying rollers 51 and 53. The levers 47 are pivotally mounted on shaft 50, the rollers 51 and 53 each bearing against one cam disc of a cam disc pair 52 and 54. The two cam disc pairs 52 and 54 are fast on a drive shaft 55 rotatable in a clockwise direction once during each machine operation.

During each machine operation these cam discs 52 and 54 rotate the levers 47 first counter-clockwise around the shaft 50 as a center and then back to normal position. At this time, the rod 45 rocks the lever 44 and block 46 first clockwise about the shaft 48 and back again, which by means of the links 43, arms 42 and the tube 41, rocks the actuators 31 of the amount differential devices 90° in a clockwise direction and back again.

If a key of an amount key bank is depressed and consequently, by means of a key detent 138 (Fig. 14), the zero stop pawl 8 is withdrawn from its effective position, the parts 32, 33, 34 (Fig. 2), are carried along by the actuator 31 when moving upwardly until the main differential member 32 is arrested by striking the stem of the depressed amount key. Due to the continued movement of the actuator 31 with the main differential member 32 being held arrested by the depressed amount key, the pin 38 of the coupling pawl 33 is guided in an inclined slot of the main differential member which causes the parts 32, 33 and 34 to be disengaged from the actuator 31. A wedge-shaped projection of the coupling pawl 33 thereupon engages in the respective notch of a stationary notched plate 9 of the respective amount key bank, whereas the actuator 31 passes by a front extension of the coupling pawl 33 and thus holds the pawl and the parts 32-34 connected thereto in the differentially set position.

While the parts 32-34 are held in the differ-

entially set position, the beam 35, linked to the setting member 34, is cammed toward the circumference of a hub by means of a cam 49 pivoted on rod 45. Thus, through link 36, the segment 37 is set to the value of the key depressed which setting causes, in a manner set forth hereinafter, the setting of the type wheels.

Cam 49 operates in the manner of a differential lever in that, when striking the back surface of the beam 35, the upper or lower cam surface of the cam 49 is held, depending on the position of the bent lever; that is where the cam finds the strongest resistance, so that when the rod 45 continues to move, the arrested cam surface is rocked and the other cam surface urging the beam into a position determined by the value of the depressed key. Thus the cam 49 automatically finds the most favorable range for urging the beam 35 into its various positions.

When the tube 41 is returned, the actuators 31 strike a pin 39 of the pertinent setting member 34 and thereby restore the parts 32, 33, 34 to normal positions, the toothed segment 37 maintaining the set position.

During this operation of the differential device, the main differential member 32 is moved out of its zero position and up to the stem of the depressed key and restored thereafter. Through the intermediate gear 61, this motion is transmitted to the four amount differential wheels 62a-d and is transmittable from there to the selected adding wheels 63a-d of the totalizers which are engaged therewith at the time.

TOTALIZERS

As mentioned above, the totalizers are disposed so as to form four rows I-IV, the adding wheels 63a-d (Figs. 2 and 3) being mounted by denominational orders on the totalizer shafts 64a-d, and thus constitute what is generally known in the art, as "interspersed totalizers." The totalizer shafts are each supported by two arms 65 (see also Fig. 76), each pair of which are secured to one of the totalizer rock shafts 66a-d. These rock shafts are slidably supported near their right-hand ends by frame 4, and at their left-hand ends by a sleeve 666, secured thereto. The sleeve 666 is slidably supported by a stud 667 mounted in the left side frame 3. The shafts 66a-d can, therefore, be shifted axially and reciprocally, by means of a mechanism to be described later, so that, due to this shifting, the adding wheels 63a-d of a totalizer are set opposite the respective amount differential wheels 62a-d and brought into mesh with them upon rocking the totalizer shafts.

The totalizer rows are constructed substantially alike. The only difference consists in that row I comprises only four totalizers, that is, for each denominational order only four adding wheels 63a-d are provided (see Fig. 6). Fig. 3 shows only totalizer row III comprising five clerk totalizers and the necessary tends carrying mechanism. The corresponding parts of the other totalizer rows have allotted thereto the same reference numerals with the letters a, b, or d added thereto to index the respective totalizer row.

TENS CARRYING DEVICE

The amount differential wheels 62c (Fig. 3), in mesh with the main wheels 61, are mounted on hubs of rock levers 61c mounted on stationary shafts 68c (Figs. 2 and 3). A particularly formed recess of the rock levers is engaged by a pin 70c

of a tens carrying pinion 71c of the next lower denominational order, said pinion being mounted on a stationary shaft 72c. The recess 69c of the rock lever is so formed that the shaft 72c and the pin 70c of the tens carrying pinion hold the rock lever 67c in home position (Fig. 2). The tens carrying pinion has a carrying tooth 73c lying in the plane of a tens carrying disc 74c rigidly connected to the appropriate adding wheel 63c. In another plane, the tens carrying pinion 10 has a gear tooth 75c lying in the plane of a differential wheel 76 in common use for all four totalizer rows. The differential wheels 76 of all denominational orders are loosely mounted on shaft 80 and yielding secured against clockwise rotation by means of springs 77. A differential disc 78 is provided in the plane of each differential wheel 76. On a shaft 79, which is fully rotated in counter-clockwise direction during the second part of the machine operation, all the differential discs 78 are mounted in staggered position relatively to one another on a helical line, so that when this shaft is rotating, its broad differential teeth rotate the differential wheels 76 of all orders a definite extent in clockwise direction after one another, beginning with the lowest denominational order. The unmutated portion of the circumference of the differential discs 78 holds the differential wheels 76 in the new position until the differential wheels 76 of all denominational orders have been actuated, whereupon the recesses provided on the differential wheels 78 release the differential wheels 76, so that the latter are free to return to home position under the action of their springs 77.

ADDING

If, in adding, the amount differential devices and, in connection therewith, the amount differential wheels 62a-d are set to the value represented by the amount keys depressed, and a totalizer (for instance, a totalizer of row III) is selected, as will be described hereinafter, and then thrown in, the adding wheels 63c moved into mesh with the amount differential wheels, are advanced by the respective amount when the main differential members 32 are returned.

If, at this time, in one of the denominational orders the wheel passed from "9" to "0," the projection of the pertinent tens carrying disc 74c meets the carrying tooth 73c and rocks the tens carrying pinion 71c in counter-clockwise direction so far that the first tooth of the gear teeth 75c is moved in the path of the gear of the appropriate differential wheel 76. After this preparation, the rotation of shaft 79 is initiated, the differential discs 78 thereon rotating the differential wheels 76 clockwise through a definite angle. The differential wheel 76 being engaged by one of the teeth 75c of the respective tens carrying pinion 71c, rotates thereby this pinion by another unit in counter-clockwise direction, its pin 70c striking the other side of the recess 69c of the rock lever 67c and rocking this lever clockwise about shaft 68c by a definite angle. While the rock lever 67c moves, the amount differential wheel 62c mounted on its hub, rolls down the main differential wheel 61 being at rest at this time, and advances thereby the adding wheel 63c of the next higher order by one unit which wheel is in mesh with the main differential wheel 62c. Thus tens carrying is completed.

When the totalizer rows are rocked out, the adding wheels 63a-d are held locked in their

respective positions (Fig. 2) by means of locking pawls 81a-d, as the locking pawls have their rearwardly extending arms bearing against a stationary bar 82a-d. In the plane of each amount differential wheel, these bars have holes 83a-d. When the totalizer row is thrown in, the rearwardly extending arms of the locking pawls 81 associated with the selected adding wheels, gradually ride off the bar 82 and, under the action of springs, the locking pawls are held disengaged from the adding wheels 63 of the selected totalizer, so that the said adding wheels, when actuated by the amount differentials, can freely rotate. When the totalizer row is thrown out of engagement, the respective locking pawls 81 are thrown in by means of the bar 82 and secure the adding wheels in the new position.

RESETTING

If a totalizer is to be reset, the amount differential devices operate in the manner usual in adding operations with the exception that by means of a device described hereinafter, the totalizer selected at the time, is not coupled during the return movement of the main differential member 32 but during the setting movement of said member with the respective amount differential wheels 62a-d, for instance, with the amount differential wheels 62c. The main differential member 32 moving upward causes the amount differential wheels to rotate in clockwise direction and the adding wheels 63c coupled therewith at the time, in counter-clockwise direction until an adding wheel reaches zero position, and a raised portion of the appropriate tens carrying discs 74c encounters the carrying tooth 73c of the respective tens carrying pinion 71c. Since the tens carrying pinion is not allowed to move away or to turn to the right, the adding wheel is held in zero position thereby attained, and also the elements connected thereto, viz.; the amount differential wheel 62c, the main differential wheel 61 and the appropriate main differential member 32, the latter being set to the value to which the respective adding wheel was set. Before the main differential member 32 is reset, the reset totalizer is thrown out again, so that its adding wheels occupy zero position.

READING

In reading a totalizer the operation during the initial movement of the differentials 32 is the same as in connection with resetting. However, prior to the return movement of the differential, the totalizer row is again coupled with the appropriate amount differential wheels 62c in the same timing as when adding, so that the total taken from the totalizer is reentered as in adding operations.

TOTALIZER SELECTION

The selection of the totalizer or the totalizers desired for item entering or total taking operations, is controlled by the totalizer keys 11 to 17 and accomplished by the differential mechanisms associated with the three key rows (Figs. 1, 5 and 77).

The construction of these three special differential mechanisms, and the special differential device associated with the control bank, is substantially the same as that of the amount differential devices and their elements are numbered 31-39 just as the corresponding elements of the amount differential devices, said reference numerals having, however, added thereto index let-

ters to indicate the key banks which they are allotted to, that is *a* for the commodity keys 11 and 12, *c* for the clerk key groups 13, *d* for the transaction keys 14—18 and *e* for the control bank.

The special and the amount differential devices are actuated in substantially the same manner (the reference numerals of the elements of said devices having strokes added thereto). However, due to the different shape of their cam discs 52' and 54', the setting motion of the special differential devices is completed before the amount differential devices start their setting movement, and the return motion of the special differentials is started after the setting motion of the amount differentials is completed.

The special differentials and the amount differential devices differ also in that the main differential members 32*a*—*e* have no teeth (see Fig. 5 showing the four uniformly constructed special differential devices, that allotted to the clerk key bank and indexed *c*). As regards the two special differential devices for the commodity and clerk key banks, the gear segments 37*a*, and 37*c* (see also Fig. 77) respectively, set by the setting members 34*a*, and 34*c* respectively, by the associated beams 35*a*, and 35*c* respectively, and the links 36*a*, *c*, are connected to a setting segment 87*a*, 87*c* by links 86*a* and 86*c* respectively. These two setting segments 87*a* and 87*c* are set each time the machine is operated in accordance with the depressed commodity or clerk key. The teeth of the setting segments 87*a* and 87*c* are in mesh with partial gears 88*a* and 88*c* respectively, rotatable about shaft 80, said wheels being rigidly connected to toothed wheels 89*a*, 89*c* of greater diameter. The wheel 89*c* allotted to the clerk key group meshes with a gear wheel 90*c* rigidly connected to a drum cam 95*c* rotatably, but unshiftable, mounted on a stationary stud 94*c*, carried by frame 4. From the above description it is evident that when the pertinent special differential device is set, this drum cam 95*c* is adjusted in accordance with the clerk key 13 depressed at the time.

Over gear wheel 90*a*, the gear wheel 89*a* is in connection with a drum cam 95*a* (Figs. 3, 4, 5) which, thus, is adjusted according to the depressed commodity key 11 or 12 respectively, when the appropriate special differential device is set.

The special differential device for the transaction keys 14—18 has also a setting segment 87*d*, which, however, is not directly connected to the proper setting member 34*d*, but the link 86*d* connected to gear segment 37*d* (Fig. 7) is connected to a special beam 35', the other end of the beam being joined to the segment 87*d*. Gliding on the back surface of this beam 35', there is a roller 101 of a slide 102, guided on the shaft 30 and the pin 103 of a cam disc 104. A roller 106 of slide 102 bears against the cam plate 104 fast on shaft 48. Shaft 48 which, under control of the multiple-item keys 21 to 23, is rockable in a manner to be described, is normally positioned as shown in Fig. 7, in which position its cam plate 104 acts upon the guide roller 106 of the slide 102 so that its other roller 101 holds the beam 35' in contact with the circumference of a hub. With the cam plate 104 so positioned, the segment 87*d* is adjusted under control of the member 34*d*, while the multiple-item keys 21 to 23 do not exercise any control. The segment 87*d* is in mesh with a gear wheel 88*d* rotatable about shaft 80, said wheel being rigidly connected to a

toothed wheel 89*d* of greater diameter. Wheel 89*d* meshes with a gear wheel 90*d* rigidly connected to a drum cam 95*d* mounted rotatably but unshiftable on a stationary stud 94*d*. With the cam plate 104 (Fig. 7) in the shown and described position, the drum cam 95*d* is positioned according to the transaction key 14 to 18 depressed when the appropriate special differential device is set.

The cam plate 104 is pinned to shaft 48, the right-hand end of said shaft carrying a lever 107 (Figs. 9, 10, and 90). The latter, by means of a link 108, is connected to a long lever 109 loosely mounted on a stationary stud 110. Near its center, lever 109 has pivoted thereto a drive coupling means 111 connected to a two-armed lever 113 by a link 112. The two-armed lever 113 is carried by the pin 114 (see also Fig. 92) of a two-armed lever 115 carried by stud 110, lever 115 being connected by a link 116 to an arm 117 pinned to shaft 92. The other end of the two-armed lever 113 (Fig. 90) embraces pin 118 of an intermediate lever 119 pivoted on stud 110 and embracing a pin of the key detent 120. The latter is attached to the control key bank and its inclined surfaces are so shaped that it is moved upward upon depression of one of the multiple-item keys.

Moreover, the intermediate lever 119 is connected by a link 121 to a lever 122 (Figs. 9, 10 and 91) loosely mounted on shaft 60. Stud 123 of this lever carries a two-armed lever 124 having a forked upper end embracing a pin 125 of a lever 126 secured to shaft 60.

Shaft 60 (Fig. 87) carries a tube 1121 freely mounted thereon, and the tube 1121 has fastened thereto two arms 131 supporting a rod 132 (Figs. 14, 15, 39 and 87). Rod 132 carries a two-armed lever 133, the lower arm of it being connected by a link 134 to an arm 135 which, upon depression of the motor key 28, is moved to the left in a manner about to be described. The rod 132 is supported by the two arms 131 which are loosely mounted on shaft 60, and the rod extends through the width of all amount key banks. Upon this rod 132, there is guided a number of slides 137 one for each amount bank and each being linked to a key detent 138. Each key detent is attached to an amount key bank in such a way that upon depression of an amount key it is moved upward. Due to this movement, the right-hand end of the guide slot of the appertaining slide 137 is moved so as to contact rod 132.

The upper end of the two-armed lever 133 (Fig. 88) is provided with a slot into which a pin 136*a*, on a lever 136 fast on shaft 60, extends.

If no amount key is depressed and, upon depressing the motor bar, the lever 135 is moved to the left, the two-armed lever 133 is rotated about pin 136*a*, since rod 132 is allowed to give way. Thus shaft 60 and the parts connected thereto will not be turned.

If, however, upon depression of an amount key, the rod 132 is prevented from moving to the left, the two-armed lever 133 is pivoted about rod 132 when lever 135 is moved to the left. In so doing, by means of the stud 136*a*, lever 136 and, in connection therewith, also shaft 60 are moved through a definite angle in clockwise direction (Figs. 15 and 88). In all other machine operations except "No sale" about to be described, shaft 60 occupies the position shown in Figs. 9 and 15.

As the lever 135 (Fig. 87), which is rocked upon depression of the motor bar, returns to home position immediately upon releasing the motor bar, and since the shaft 60 has to occupy its rocked position, the position of the latter is maintained by means of a device described later, until the machine operation is completed.

To condition the machine for "No sale" operation, shaft 60 must also be rocked, which is effected by depressing the motor bar 28. Preparatory to this rocking motion, rod 132 must also be held, which is not caused by an amount key depressed, but by a hooked arm 393 (Fig. 89) which, upon depressing of the "No sale" key, moves behind the rod 132 (Figs. 27, 30 and 89). Through a bail 394, tube 395, bail 396 and a link 397, all said parts being loosely mounted on shaft 92, said hooked arm is connected to a key detent 398 of the transaction key bank. This key detent has inclined surfaces so shaped that, upon depressing one of the "Received on account" and "Paid out" keys 15 or 17, the detent is moved upward by two steps. The hooked arm 393 is so shaped that, upon depression of the key 15 or 17, it lies outside the path of rod 132, however, upon depressing the "No sale" key 18, it catches over rod 132 and prevents the latter from being moved to the left, so that upon depressing the motor bar, shaft 60 will be rocked in the before-mentioned manner.

The bail 394 which, upon depression of the "No sale" key 18, is rocked, comes to lie before the small slides 137 of all amount key banks by which depression of the amount keys is prevented. On the other hand, when an amount key is depressed, the "No sale" key cannot be operated.

The lower arm of the two-armed lever 124 (Fig. 9) is connected by a link 127 to a drive coupling member 128 (Figs. 9, 10, 11 and 92) joined to arm 117 fast on shaft 92. A U-shaped recess of said coupling member is engaged by a pin 129 of a slide 130 guided on shaft 55 and a stationary stud, a roller 130a of said slide engaging in a groove of a cam disc 56 fast on shaft 55. The cam disc 56 has teeth 57 permanently in mesh with a gear 58 of same diameter fast on the main shaft 50, and rigidly connected to a cam disc 59, provided with teeth 59a forming a gear of greater diameter than gear 58. The big gear 59a meshes with a gear 141 of half the diameter of gear 59a, gear 141 being rotatably mounted on a stationary hub 142 and being given, by the crank 143, a double rotation in clockwise direction (Fig. 9) when the machine is manually operated. This drive motion is transmitted to the shafts 50 and 55 so as to cause a single rotation of said shafts for each machine operation. The groove of the cam disc 59 fast on shaft 50 is engaged by a roller 145 of a slide 146 shiftably guided on shaft 50 and hub 142 and having a pin 147 engageable by a recess 111a of the coupling member 111.

If no amount, or no multiple-item, key is depressed, the parts of the described device are positioned as illustrated in Fig. 9. If now the machine is operated, for instance, for taking a sub-total or total from one of the totalizers, the motion of the slides 130 and 146 causes no effect as their pins 129 and 147 idly move to and fro within the recesses in the coupling members 128 and 111.

If an amount is set up to record a single-item transaction, the shaft 60 is rotated clockwise upon depression of the motor bar. The arm 126 fast on shaft 60 thereupon rocks the two-

armed lever 124 about stud 123, as the lever 122 is held in normal position due to the multiple-item key not being depressed. By means of the link 127, this rocking movement of the two-armed lever 124 is transmitted to the coupling member 128 which is moved by one unit to the right and, thus, due to the shape of the recess formed therein, brought into positive connection with the pin 129 of slide 128. At this time, the coupling member 111 is not displaced, so that the actuated slide 146 does not cause any effect. However, when driven, the slide 130 carries the coupling member 128 upward, after about one-third of the machine operation, and returns it at the end of the machine operation. Thereby shaft 92 is rocked counter-clockwise and clockwise again. Through link 116, this motion is transmitted to the lever 115 which rocks clockwise, and thus moves the stud 114 to the left. This movement rocks the two-armed lever 113 clockwise about the arrested pin 118, whereby the link 112 moves the coupling member 111 to the left. This adjustment of member 111 does not change the operating conditions because the pin 147 of the slide 146 does not contact the slide 111 when the slide is in that position and thus is moved idly.

If, in addition to an amount key, a multiple-item key is depressed, as is the case in recording items of a multiple-item transaction, the parts connected to member 111 are moved to position the member 111 into coacting relationship with the stud 147, so that slide 146 can rock shaft 48 to select the multiple-item totalizer to receive the multiple-item entry.

Upon depressing a multiple-item key and by means of the key detent 120 (Fig. 90) and the angular lever 119, the two-armed lever 113 is rocked in counter-clockwise direction about stud 114 and thereby the coupling member 111 is moved to the right far enough to position a surface 111b of the recess formed therein under the pin 147 of slide 146. Upon depressing an amount key and rotating shaft 60, the coupling member 128 is moved into position to be actuated by stud 129 of the slide 130. Further, through the lever 119 (Fig. 91) and the link 121, the motion of the slide 120 is transmitted to the arm 122. Stud 123 of said arm rocks, at that time, the two-armed lever 124 (Fig. 9) in counter-clockwise direction about pin 125 and thus moves the coupling member 128 another step to the right, whereby the lower left-hand corner of the U-shaped recess is moved opposite the pin 129. Thus in machine operations, with the parts positioned for recording multiple-item transactions, the movement of slide 130 has no effect, that is, the shaft 92 is not rotated at this time. Shortly after the machine operation is started, the slide 146 is moved down by the cam disc 59, whereupon the pin 147 carries the coupling member 111 along. By means of the long arm 109 (Fig. 90), the link 108 and the lever 107, shaft 48 is rocked clockwise against the action of a spring 148. By this rotation of shaft 48, the cam disc 104 (Fig. 7) is removed from the roller 106 and its pin 103 pulls the slide 102 upward. Slide 102 has a pin 99 extending into an arcuate recess 98 of the segment 87d. In so doing, the pin 99 engages the right-hand surface of this recess and thus rocks the segment 87d clockwise out of the position into which it was moved during the previous machine operation, into the first, or No Sale key position.

Consequently, by the device described later,

the totalizer row IV is restored to its right-hand home position, in which the adding wheels of the multiple-item totalizer are brought into alignment with the amount differential wheels 62d. Therefrom it becomes evident that when a multiple-item key is depressed, the multiple-item totalizer is selected.

The multiple-item totalizer is selected at the beginning of the first machine operation for recording a multiple-item transaction and is maintained during the entering of all items belonging to said transaction, since at this time the spring 148 is overthrown (i. e., has passed its dead point). Consequently, all items of the multiple-item transactions are added into the multiple-item totalizer.

Also in taking the multiple-item total, the multiple-item totalizer is held in the above described position by the actuated shaft 48 during the first third of the machine operation. As mentioned already, after the first third of the total taking operation, shaft 92 (Fig. 92) is rocked counter-clockwise, and by means of the parts 116, 115, 114, 113, 112, the coupling member 111 is pulled to the left, whereby its surface 111c is moved above the pin 147, the pin 47 at this time is occupying its lower position. Slide 146 being moved upward again by cam disc 59, shaft 48, against the action of the thrown over spring 148, is restored to home position in which it is held by spring 148. While shaft 48 is being turned back, its cam disc 104 (Fig. 7) is moving the slide 102 downward again. The roller 101 of said slide causes the beam 35f to re-engage the hub, and, as the appropriate segment 37d, which was previously set according to the respective kind of transaction, is held in its set position, the segment 37d is adjusted to a corresponding position by urging the roller 101 towards the beam 35f. By this, in a manner to be described later, the totalizer row IV is shifted so that the totalizer for the respective transaction is operatively positioned, which totalizer will, now, be thrown in to have entered thereon the total taken from the multiple-item totalizer.

In order to aline the drum cams 95a, 95c and 95d after being set, and to hold them in the positions set, the toothed wheels 89a, c, d of greater diameter have locking teeth Figs. 5 and 7 engaged by a locking bar 151, supported by two arms 152 mounted on shaft 153. First, this locking bar, under the moderate action of a spring, engages in the locking teeth of the wheels 89a, c, d, so that said bar is able to yield while these wheels are adjusted. After the wheels are set, the locking bar 151 is rigidly held in the respective locking teeth by means of a suitably shaped cam disc 154 fast on the main drive shaft 50. By this the cam groove drums 95a, 95c, 95d are held in their set positions while the totalizer is operated.

The drum cam 95a is provided with a cam groove (Fig. 16) which coacts with two rollers 96a and 96b, the drum cam 95c (Fig. 17) coacts with a roller 96c, and drum cam 95d (Fig. 18) coacts with roller 96d. (See also Figs. 5 and 77.) The four guide rollers 96a to 96d are secured to slide forks 97a to 97d respectively. Each fork is rotatably but unshiftable mounted on a totalizer rock shaft 66a to 66d. Said slide forks are secured against rotation by their prongs engaging both sides of the circumference of the appropriate drum cam. By turning the drum cams, the totalizer rock shafts are shifted longi-

tudinally and rocked counter-clockwise and clockwise by a device about to be described.

The cam grooves of the drums 95a, 95c and 95d are so shaped that when the special differential devices are in home or zero positions, the totalizer rock shafts 66a to 66d occupy their extreme right-hand position (Figs. 3, 6, 8B). The totalizer rows secured to the rock shafts are then so adjusted that in row I no adding wheels are in the plane of the pertinent amount differential wheels 62a, while, in row II, the adding wheels of the totalizer having allotted thereto the commodity key "V" are in line with the amount differential wheels 62b. In row III, the adding wheels of the clerk totalizer 5 (Fig. 3), and in row IV the adding wheels of the multiple-item totalizer are in line with the proper amount differential wheels 62d.

When the main differential member 32a of the commodity key bank is moved upward, first the totalizer row II, due to the shape of the cam groove of drum cam 95a (Figs. 6, 16) and by means of the guide roller 96b, is shifted to the left by one step according to the position of the key depressed. By this, after one another, the totalizers having allotted thereto the commodity keys "V," "T," "S," "N," "K" are selected. The totalizer row I is not shifted. Only after the main differential member 32a moves beyond the position according to the depressed commodity key "K," totalizer row I is shifted by the guide roller 96a to select the totalizers associated with the commodity keys "J," "H," "F," "D," the totalizer row II not being shifted any more.

In the same manner, when the main differential member 32c of the clerk key bank moves upward, totalizer row III is so shifted, by means of the cam groove of drum cam 95c and roller 96c (Figs. 3, 17 and 77), that, each time, the appropriate amount differential wheels 62c are in the plane of the adding wheels of the clerk totalizer when the main differential member reaches the stem of the clerk key associated with said totalizer (see also Fig. 3). The same is true regarding shifting totalizer row IV by drum cam 95d (Figs. 8 and 18B), to select the totalizers which are associated with the keys "Received on account," "Charge" and "Paid out." When a cash sale is to be entered, the main differential member of this bank is not held by a key, but by a solid stop 19 (Fig. 4) attached to the transaction key bank in between the keys 15(B) and 14 (cash $\frac{X}{Z}$). The zero stop pawl 1256 of this bank is carried by stud 1253 (Figs. 4 and 27), and connected by a spring 1255 to a lever 1254 pivoted on stud 1253. The lever 1254 has a forked end to embrace a pin 1252 fast on link 263. As will be described later, the link 263 is connected to lock 26 in such a manner that, when the lock is set to "Add," the said link is in its left-hand end position shown, but is moved to the right when the lock is set to "X" or "Z." The arrangement is such that when the lock 26 is set to "Add," the zero stop pawl 1256 is kept outside the path of an extension 1257 of the main differential member 32d. Consequently, this differential member is free to move at each adding operation till it contacts the key depressed or the stationary stop 19 respectively. By setting lock 26 to "X" or "Z," the pawl 1256 is moved into the path of the extension 1257, thus holding the differential member 32d in zero position, to enable the clearing of a commodity or clerk total-

izer. If, however, a transaction totalizer is to be cleared, upon depressing one of the keys 14—17, slide 206 (Fig. 4) or 290 is moved upward, and extensions 206a and 290a respectively of the respective slide strike a bent over portion 1258 of the zero stop pawl 1256 and move said pawl into ineffective position against the tension of spring 1255. Consequently, the differential member 32d is able to contact the depressed key or the solid stop 19, and thus select the respective totalizer for total taking operations.

TOTALIZER ENGAGING DEVICE

The adding wheels 63a—d (Figs. 3 and 4) of the totalizers selected in the manner described before, are brought into engagement with the respective amount differential wheels 62a—d at different times, depending on the kind of operations, that is, adding, total taking or sub-total taking operations.

To this end, engaging devices are provided, one for each totalizer row and since they are all constructed alike, only that allotted to the clerk totalizer row III will be described hereinafter.

The corresponding parts of the other devices are referred to by the same numerals suitably indexed.

At the right-hand end of the totalizer rock shaft 66c, there is secured a lever 161c (Figs. 3, 4, and 77) having a forked end to embrace a stud 162c eccentrically attached to a short shaft 163c (see also Fig. 128) rotatably supported in the side wall 2 and a small partition 5. This shaft has teeth to mesh with a gear segment 164c loosely mounted on a stud 166c fast on the side wall 2, said stud being aligned with the co-ordinated shaft 66c. Normally, the gear segment 164c is held by a spring 165c in contact with a stationary stop 167c, and has two rearwardly extending arms 168c carrying a short shaft 169c. Fixed on a hub on this short shaft are two arms 171c, 172c. Arm 172c has linked thereto a link 173c connected to a locking segment 174c loosely mounted on shaft 80. Another pulling rod 175c pivoted to the locking segment 174c, is connected to a two-armed lever 176c loosely mounted on sleeve 20 supporting the middle shaft 30. Normally, a spring 177c attached to lever 176c, holds this lever in contact with a stationary stop 178. By this the two arms 171c, 172c are held positioned as shown in Figs. 4 and 128.

Coupling pins 181c and 183c, and 182c are attached to arms 171c, 172c (Figs. 3 and 4) respectively. Pin 181c lies in the plane of a coupling disc 210 (see also Fig. 127) rotatably mounted on shaft 80 and connected by means of a pulling rod 211 to a roller carrying lever 212. This lever is pivoted on a stationary stud 190. Its two rollers 213, 214 cooperate with two cam discs 215, 216 fast on the main shaft 50. These cam discs are so shaped that, after the amount differential device is set, said discs rock the roller carrying lever 212 in counter-clockwise direction and restore it after tens carrying is effected. This movement occurs during each machine operation and is transmitted, in the opposite direction of rotation, to the coupling disc 210.

If, by means of devices to be described later, which actuate the two-armed lever 176c (Fig. 128), the arms 171c, 172c are clockwise turned through a certain angle, the coupling pin 181c comes into engagement with the coupling disc 210 as shown in Fig. 127.

When the coupling disc 210 is actuated in the manner described, the gear segment 164c, by

means of the coupling pin 181c, is rocked counter-clockwise, thereby rocking the shaft 163c and the pin 162c clockwise (Fig. 77). In so doing, the pin 162c rocks the lever 161c and the totalizer frame for row III secured to shaft 66c counter-clockwise (Fig. 2). Thus after the setting of the main differential members 32 is finished, the adding wheels 63c of the totalizer selected at a time, are brought into mesh with the amount differential wheels 62c where they were previously set according to the amount set up on the keyboard. After the amount is entered and the tens carrying is completed, the cam disc 210 is turned back, the totalizer row is disengaged, and the locking pawls 81c (Fig. 2) maintain the adding wheels in their new positions.

In the same manner, the other three totalizer rows can be engaged with the disc 210, and, when the latter is actuated, the rows are thrown in for adding.

In addition to the coupling disc 210 for engaging the totalizer rows for adding operations, there is provided another coupling disc 230, actuated by two cam discs 235, 236 (Figs. 4 and 13), through a pulling rod 231 and a lever 232 having two rollers 233, 234. These cam discs are so formed that the disc 230 is, first, rotated clockwise after the special differential devices are adjusted (totalizer selection) but before the amount differential devices are set, the disc 230 being returned, however, after setting the amount differential devices.

If, during an operation of the machine, one of the coupling pins 183a—d of the four totalizer rows cooperates with the coupling disc 230, the selected totalizer is engaged and disengaged from the differential device in "reset" timing.

A third coupling disc 220 is actuated by two cam discs 225, 226 (Figs. 4, 13) through a pulling rod 221 and a lever 222 having two rollers 223, 224. The cam discs 225 and 226 are secured to the main drive shaft 50, and are so shaped that the coupling disc 220 performs its first rocking motion prior to setting the amount differential devices, then is returned to its home position to disengage the totalizer for a short period, after which the plate 220 is again rocked to engage the totalizer, and finally the plate is again returned after the tens carrying is completed. The reason for the disengaging movement for the short period will be apparent when considering the transfer total operation.

Each time one of the coupling pins 182a—d is engaged with the disc 220, the above movements of the disc cause the selected totalizer to be engaged with and disengaged from the differential device in sub-total, or "Reading" timing as shown in the time chart, Fig. 132.

SELECTION OF THE TOTALIZER ROW TO BE ENGAGED

By links 179a—d (Figs. 8A, 8B and 4) the angular levers 176a—d are connected to pulling rods 185a—d. The two pulling rods 185a, 185b are pivoted to a lever 186 (Figs. 4, 12 and 70). The latter is pivoted on a stationary stud 187 and has a roller 188 bearing upon the circumference of cam disc 189. By means of its hub and a pin 191, said lever is rigidly connected to another lever 192 having a guide roller 193 bearing upon the circumference of a cam disc 194. A pin of the downward extending arm of lever 192 has linked thereto the pulling rod 185d (Fig. 81). The two cam discs 189 and 194 are secured to the drive shaft 55 and so shaped that, when fully rotating in clockwise direction, they cause

the pulling rods 185a, 185b and 185d to move down shortly after the machine operation is started, and to return at the end of the machine operation.

The lower end of the pulling rod 185c (see also Fig. 70) is pivoted to the lower arm of the intermediate lever 195 loosely mounted on the pivot 191 interconnecting the actuating levers 186 and 192. The upper arm of the intermediate lever has a slide surface cooperating with a roller 196 attached to lever 197 loosely mounted on the stationary stud 187. A spring 198 attached to lever 197 holds stud supporting the roller 196 (see Fig. 12) in contact with the upper edge of lever 186. Pin 201 (see also Fig. 83) of lever 197 has pivoted thereon a pawl 202 having a pin 203 embraced by the forked right-hand end of a two-armed disengaging lever 204. The forked left-hand end of lever 204, rotatable about the middle shaft 30, embraces a pin 205 of a key detent 206 shiftably attached to the transaction key bank. This key detent has two inclined surfaces cooperating with the pins of the keys 16 and 17 "Charge" and "Paid out" in such a way that, upon depression of one of these keys, the slide 206 is moved upward and the disengaging lever 204 is rocked clockwise against the action of a spring 207.

When the keys 16, 17 are not depressed, the spring 207 holds the disengaging lever 204 and the pawl 202 in the positions shown in Fig. 83. The pawl 202 lying in the plane of a disengaging disc 208 (Fig. 70) fast on the drive shaft 55, is then out of the path of disc 208. During a machine operation the interconnected roller carrying levers 186 and 192 are actuated as described, lever 195 being carried along by means of the stud 191. If the keys "Charge" and "Paid out" are not depressed and, due thereto, the parts 202-206 are positioned as shown in Figs. 4 and 83, the lever 195 is urged by roller 196 bearing upon its back surface (see also Fig. 70), to rock about the stationary stud 187. Its lower arm moves in the same way as the corresponding lower arms of the roller carrying levers 186, 192. At this time, the pulling rod 185c is actuated in the same way as the rods 185a and 185b and 185d are actuated.

If, however, a key 16 or 17 is depressed, the key detent 206 is moved upward and, through the disengaging lever 204, the pawl 202 is lowered till its front portion enters a recess of the disengaging disc 208. In the following machine operation, disc 208 pushes the pawl 202 back and thus rocks the lever 197 clockwise until the roller 196 is removed from the back surface of lever 195. If, now, the roller carrying levers 186, 192 are actuated, only the pivot 191 of lever 195 is carried along, but the pulling rod 185c is not actuated, as the parts connected to this pulling rod resist to a certain extent the actuating movement of lever 195, while the upper end of lever 195 is able to operate easily, because at this time it is not arrested by roller 196.

By means of this device, normally, all the four pulling rods 185a-d, provided for rocking the four totalizer rows into operative position, are actuated, but, with the "Charge" key 16 or "Paid out" key 17 depressed, the pulling rod 185c, which rocks the clerk totalizer row III, is not actuated.

While the clerk totalizers are prevented from being operated during recording "Paid outs" and "Charges," the commodity totalizers are to be kept disengaged during "Paid out," "Received on account" and "No sale" machine operations. As

these machine operations do not require the depression of commodity keys, this effect can be obtained directly by locking the commodity keys. To this end, the before-mentioned key detent 398 of the transaction key bank (Figs. 27 and 89) is utilized, which is moved upward by one unit upon depression of a key 15 or 17, and by two units upon depressing (No sale) key 18, and thereby rock the two balls 396 and 394 loosely mounted on shaft 92 and interconnected by a tube 395. Fast on tube 395 are two locking discs 275, 276 (Figs. 22 and 30) which, by the rotation of the tube 395, are moved into the path of the upper ends of two key detents 257, 258 of the commodity key bank and thus obstruct the upward movement given said detents upon depressing the commodity keys 11 and 12 respectively. That means, upon depressing one key 15, 17 or 18, the commodity keys 11 and 12 are held locked, and therefore, the differential for selecting the commodity totalizers is arrested in the zero position to prevent selection of a commodity totalizer.

MODE OF OPERATION CONTROL DEVICE

From the foregoing description it is to be seen that the sequence of throwing the totalizers into and out of operation is timed in accordance with the coupling of the respective totalizer row with one of the three coupling discs 210, 220 or 230.

With reference to Figs. 4 and 8A it was mentioned that the arms 171a-d and 172a-d carrying the corresponding coupling pins 181a-d, 182a-d and 183a-d are connected through the links 173a-d, 174a-d and 175a-d, to the angular levers 176a-d, which normally are held by springs 177a-d in contact with a stationary stop 178. With the parts so positioned none of the pins 181a-d, 182a-d, 183a-d is in engagement with the coupling discs 210, 220, 230, so that when one of the three discs is actuated, none of the four totalizer rows is thrown in.

Pivoted to the front ends of the pulling rods 185a-d, there are other links 241a-d (Figs. 4 and 8B) connected to three-armed levers 242a-d mounted on shaft 48. Normally, the rearwardly extending arms of these levers bear upon a stationary shaft 243, the upward extending arms of the three-armed levers lying outside the path of two-armed levers 244a-d. The three levers 244a-c are loosely mounted on a shaft 60, lever 244d (see also Fig. 81) being fast on shaft 60, and the shaft 60 has another lever 246 (Fig. 84) rigidly connected thereto. Shaft 60, as before-mentioned, is clockwise rotated through a definite angle only when, at least, one amount key has been depressed for a machine operation. In this event, the interconnected levers 246 and 244d are rocked clockwise until the lever 244d comes to lie before the upper arm of the three-armed lever 242d. If, now, the pulling rod 185d is pulled down by the actuating discs 189, 194, the three-armed lever 242d is held by lever 244d and cannot give way. Thus, by means of the parts 179d, 176d, 175d, 174d, 173d, the entire drive of the pulling rod 185d is transmitted to arms 171d, 172d, so that the latter are clockwise rocked through three units, which causes the coupling pin 181d to engage disc 210. From this it is to be seen that in each machine operation when an amount key is depressed, that is, whenever an amount is entered, the totalizer row IV is coupled with the disc 210 throwing in the totalizer row while the amount differential members 32 are restored for amount entering and tens carrying.

Pivoted on studs 251a-c (Figs. 4 and 84) of the lever 244a-c, are smaller two-armed levers 252a-c having forked ends embracing pin 245 of lever 246, and pins 253a-c attached to their lower ends to engage in slots of arms 254a-c respectively. These arms are loosely mounted on a shaft 250 and, by means of bails 255a-c (see also Fig. 95), the arms are rigidly connected to arms 256a-c. Arm 256c is connected to a key detent 259 having inclined surfaces cooperating with the pins of the clerk keys 13 in such a manner that, upon depression of a clerk key, the key detent 259 is moved upwardly and thereby the bail 255c and arm 254c is rocked counter-clockwise. The arms 256a, 256b have linked thereto key detents 258 and 257 respectively (Fig. 22) cooperating with the commodity keys 11 and 12 so that, upon depression of one of these keys, bail 255a, or 255b respectively, is counter-clockwise rocked. When an arm 254a-c is rocked, upon depressing a commodity or clerk key, the appropriate small two-armed lever 252a-c is also moved, in counter-clockwise direction about the stud 245, which, when no amount key is depressed, maintains the position shown. Due to this motion of the respective small two-armed lever 252a-c, the proper stud 251a-c is moved to the right by one unit and thus the corresponding two-armed lever 244a-c is rocked clockwise. This movement, however, is not quite sufficient to move the rear arm of the two-armed lever 244a-c in front of the upper arm of the pertinent three-armed lever 242a-c.

It has already been mentioned that, when the shaft 60 upon depression of an amount key is rocked, the lever 246 and stud 245 are clockwise rocked by two units. If, at this time, no commodity or clerk key is depressed, the pins 253a-c of the small two-armed levers 252a-c associated with said keys, are positioned as shown in Figs. 4 and 84. As the upper ends of these three small two-armed levers embrace the stud 245, they are rocked clockwise about their pins 253a-c when the stud 245 is rocked, thus carrying along the two-armed levers 244a-c pivoted on the studs 251a-c and rocking them by one unit in clockwise direction about shaft 60. This movement, however, is not quite sufficient to move the rearwardly extending arms of the two-armed levers 244a-c before the respective upper arms of the three-armed levers 242a-c.

If, upon depression of one or more amount keys, the two-armed levers 244a-c rock by one unit as beforementioned (lever 244d having been rocked by two units as before-mentioned); and one of the two-armed levers 244a-c is rocked in clockwise direction by one unit by a transaction key in the above described manner, then the respective two-armed lever 244a-c will be in position with its rear arm lying before the upper arm of the appropriate three-armed lever 242a-c which thus is prevented from moving counter-clockwise.

In every amount entering operation the lever 244d (Fig. 81) is moved into locking position. Of the levers 244a and 244b associated with the commodity keys, only one can be moved into locking position at a time, since, due to the arrangement of an interlocking device of known mechanism, only one of the commodity keys situated in a key bank can be depressed for any amount entry operation. If a clerk key is depressed in addition to a commodity key, which is requisite in amount entering, the two-armed lever 224c is also rocked into locking position. This prevents

a counter-clockwise movement of the levers 242a, or 242b, 242c, 242d lying opposite the levers 244a, or 244b, 244c, 244d which are rocked. If, now, the cam discs 189, 194 actuate the pulling rods 185a-d, then, in the locked lever groups, the entire actuating movement of the pulling rods is used up for rocking the arms 171a or 171b, 171c and 171d into operative positions, whereby the pins 181a, or 181b and 181c and 181d are brought into engagement with the disc 210 for "adding." Pulling rod 185a or 185b associated with the three-armed lever 242a, 242b not locked, transfers its full actuating motion to the idly rocking three-armed lever 242a or 242b, since the latter does not provide as much inertia as do the parts under tension of springs 177a or 177b. Now, when the disc 210 is actuated, the totalizer rows I or II, III and IV coupled therewith, are thrown in for amount entering.

In all machine operations, where amounts are entered, this action is always the same, regardless whether single-item, or multiple-item transactions are to be recorded, as in either event at least one amount key, a commodity key and a clerk-key are depressed.

For total taking operations, no amount key is depressed and, hence, none of the levers 244a-d is rocked into position to lock the three-armed levers 242a-d. Therefore, when the pulling rods 185a-d are operated, the three-armed levers 242a-d would be rocked idly. However, other locking devices are provided which determine the movements of the three-armed levers 242a-d. Substantially, these locking devices consist in five locking discs 261a-e (Figs. 4, 19, 20, and 85) cooperating with the pins 262a-d of the three-armed levers. Pin 262d cooperates with the locking discs 261d and 261e (Fig. 86). All locking discs are mounted on a shaft 260. Disc 261e is connected by a rod 263 to an angular lever 264 attached to the control bank. The other arm of said angular lever has formed therein a cam groove 265 engaged by a pin 266 of a slide 267 shiftably attached to the control bank. This slide has teeth 268 meshing with a gear wheel 269 (Fig. 9). The latter is fixed to the barrel of the lock 26 which is able to be rotated to the right and left depending on which of two keys is inserted in order to condition the machine for "Resetting" and "Reading" respectively in a manner to be described.

When the key is turned to the left, slide 267 (Fig. 21) is moved down and, when the key is turned to the right, it is moved up. In either movement of the slide, the pin 266 of the slide moves within the curved slot 265, which slot is so shaped that the angular lever 264 is moved one step in a counter-clockwise direction when the slide 267 is moved down, and two steps in a counter-clockwise direction when the slide moves up. Over the link 263, this motion of the lever is transmitted to the locking disc 261e causing it to rotate clockwise, whereby the stop surface 271 (Fig. 4) of said disc is removed out of the path of pin 262d.

The locking disc 261e is, by means of a ball and a cross bar 281, connected to a disc 282, and a spring 283 tends to rotate said discs clockwise. The cross bar 281 has pivoted thereto four links 284a-d each being pivoted to a link 285a-d. These links are connected to arms 254a-d which are rocked upon depression of the associate totalizer keys. The manner in which the arms 254a-c are rocked counterclockwise upon depression of commodity and clerk keys has been

described above. A sleeve 256h (Fig. 102) connects arm 254d to arm 256d (Figs. 4, 19, 8A), the latter cooperating with a key detent 290 attached to the transaction key bank so that, upon depressing a key 14, 15, or 17, the arms 256d and 254d are rocked counter-clockwise. The rear ends of links 285a—d, pivoted to arms 254a—d, carry pins 286a—d, projecting into L-shaped slots of levers 287a—d pivoted on studs 280. Each lever 287a—d is connected by a link 288a—d to a locking lever 289a—d loosely mounted on a stud 290. Each locking lever has attached thereto a spring 291a—d holding extensions of levers 287a—d in contact with shaft 260. The pins 286a—d are located in the left-hand lower corner of the L-shaped slot, when the total taking lock 26 has not been operated, that is, when the machine is adjusted for entry operations. Each rock lever 287a—d (Fig. 85) has a pin 292a—d engaging into the forked slot formed in the locking discs 261a—d. If, with the parts adjusted, as illustrated in Figs. 4 and 86, one or more totalizer selecting keys are depressed, the associated arms 254a—d and the links 285a—d are moved to the right, thus moving the pins 286a—d idly within the horizontal portion of the L-shaped slot.

If, however, the lock 26 is set to "Reading" (X) or "Resetting" (Z), the disc 261e, as mentioned already, is rocked clockwise by one or two units respectively. At this time, by means of the cross rod 281 and the links 284a—d, the links 285a—d are rocked correspondingly, so that their pins, when the lock is set to "X" or "Z" respectively, are positioned at 286' and 286'' (Fig. 85) respectively. Now, if a totalizer selecting key is depressed, the pertinent link 285a—d is moved to the right, and the pin 286 of the respective link rocks the associated rock lever 287 in a counter-clockwise direction.

By this motion of the rock lever 287 the associated locking disc 261a—d is given a clockwise movement. If the pins 286a—d of the links 285a—d occupy their middle position 286', the rock lever 287 associated with the rod actuated at a time and the appropriate locking disc are moved by one unit, due to which a locking surface 272 of said disc is set opposite the respective pin 262. If the pins 286a—d of the links 285a—d are previously set at 286'', by depressing a totalizer selecting key the appropriate rock lever 287 and, in connection therewith, also the associated locking disc are moved by two units. Thereby a locking surface 273 is moved opposite the respective pin 262.

If, by the machine drive, the links 185a—d are moved down, the three-armed levers 242a—d are able to follow this drive until the pin 262 of one of them strikes the locking surface 272 or 273 adjusted at a time and is arrested thereby. The balance of the actuating motion of the respective link 185 will now be transmitted to the appropriate arms 171, 172 which thus are rocked by one or two units, respectively, depending on whether the locking surface 272 or 273 is in position to arrest movement of the lever 262a—d. When rocked by two units, the pertinent pin 182 comes into engagement with the clutch disc 220 which, when driven, causes the respective totalizer row to be thrown in for reading. The actuating movement of the links 185 is transmitted to the three-armed levers 242a—d. As the latter are not obstructed in any way they rock idly.

To prevent, in total taking, more than one totalizer from being engaged with the differen-

tial mechanism, the locking levers 289a—d cooperate with an interlocking device, consisting of a plurality of locking pawls 293 pivotally attached to the rear wall of the machine (Fig. 19). The upper ends of said pawls are pointed, so that the operated locking lever 289 which, when the lock 26 is turned to "X" or "Z" and a totalizer selecting key is depressed, can be rocked clockwise and move in between two adjacent locking pawls. The requisite movement of the locking pawls is limited by stop pins 294 (Fig. 19) arranged to the right and left of said pawls, so that, each time, only one of the locking levers 289a—d can be moved in between the locking pawls 293. Due to this arrangement only one totalizer key can be depressed each time when the lock 26 is turned to "X" or "Z."

To take a multiple-item total, lock 26 will not be operated and, hence, no locking disc 261a—e will be moved out of its normal position (Figs. 4 and 85). No amount key being depressed at this time, the shaft 60 with the arms 246 and 244d will not be rotated and none of the three-armed levers 242a—d will be locked. The actuating motion of the links 185a—d is then entirely controlled by the three-armed levers 242a—c, as the latter are not arrested, and thus they are able to rock the maximum extent. Only pin 262d of the three-armed lever 242d, after having traveled one third of all its way, meets the locking surface 271 of disc 261e, so that the remaining two thirds of the actuating motion of the links 185d is transmitted to the arms 171d and 172d through the linkage 173d, 176d, 175d, 174d, 173d, whereby pin 182d is engaged with disc 220. This disc then causes the totalizer row IV to be positioned for "Reading," that is, the multiple-item totalizer of totalizer row IV is engaged with the differential mechanism prior to the movement of the amount differential device and disengaged after such movement is finished. Thereafter, the totalizer row IV is shifted to select another totalizer, whereupon the totalizer row IV is again rocked in, prior to the return movement of the amount differential devices, and rocked out again after the differential devices return home.

The reading operation is utilized for taking a multiple-item total because not only is the multiple item totalizer reset, but also the total taken from said totalizer is transferred to the selected transaction totalizer arranged in the same totalizer row, which transaction totalizer is to have accumulated thereon the respective multiple-item total. The means for accomplishing this selection of a transaction totalizer to receive the multiple-item total has been described in connection with the description of the totalizer selecting means.

MACHINE RELEASE MEANS

Releasing the machine for operation is effected by depressing the motor bar 28. Connected with the motor bar is a plate 301 (Fig. 94) guided on a frame 302. The plate 301 has a pin 303 cooperating with an angular lever 304 pivoted on a stationary stud 305 and connected by a link 306 to an arm 307 mounted on shaft 92. The arm 307 is rigidly connected to a bail 308 loosely mounted on shaft 92, said bail being connected to a tube 309 (see also Fig. 40). Fast on the left-hand end of said tube is the before-mentioned lever 135 for rocking the shaft 60 (see also Fig. 15). The left-hand arm of bail 308 has connected thereto a link 311 (Fig. 94) connected to a lever

312 loosely mounted on shaft 60. Link 306 has attached thereto a spring 313 tending to rotate the angular lever 304 in clockwise direction, and by this keep the motor bar in normal position and the bail with the levers 135 and 312 connected thereto, in the position shown. A stud 315 of a slide 316 normally bears against the left side of lever 312. The slide 316 is pivoted to the upper end of the two-armed lever 317 and guided on rod 318. The two-armed lever 317 is carried by the stud 320 of a slide 321 (Fig. 99) shiftably attached to the transaction key bank and normally held in its upper position by a spring 322. Joined to the lower end of the two-armed lever 317 is a link 324 connected to a lever 325 loosely mounted on a stationary stud 1326.

If the motor bar 28 is depressed, but no other key operated, then, through the bail 308, the lever 312 is rocked counter-clockwise. In so doing said lever urges the slide 316 to the left, whereby the two-armed lever 317 is turned on stud 320, the slide 321 is held in normal position by the spring 322, and the lever 325 rocks idly. Since the release mechanism is actuated by the slide 321, as will be described later, the machine is not released at this time, that is, upon depression of the motor bar only. After the motor bar is released, the parts 308, 312, 316, 317, 325, which have been moved upon depression of the motor bar, are restored to normal position under the action of spring 313 (Figs. 94 and 99).

Before the machine can be released for operation by the motor bar 28, it is necessary to depress one of the control keys 11 to 17. Depression of any one of these keys rocks lever 326 into the path of lever 325. Such position of 326 will arrest lever 325 upon depressing the motor bar, and mechanism about to be described will thereby be operated to release the machine for operation.

Depression of the motor bar 28, as above described, rocks the lower end of lever 325 counter-clockwise and thereby rocks the lever 325 opposite a locking lever 326 loosely mounted on shaft 48. The lever 326 is normally held outside the path of lever 325 by a weak spring 329. A link 327 (Figs. 95 and 102) connects the locking lever 326 to a bail 328 loosely mounted on shaft 60. The left-hand traverse edge of said bail is engaged by the noses of three levers 331, 341, 351 (Figs. 103, 95, and 102, respectively) also mounted loosely on shaft 60 and connected by links 332, 342, 352 to levers 333, 343, 353 loosely mounted on shaft 250 (see also Figs. 29 and 41). Lever 333 has two extensions 334, 336 engaging, under the action of a spring, pins 335 and 337 of bails 255a and 255b respectively. Under the action of a spring, the extensions 344 (Fig. 95) of lever 343 engage pin 345 of bail 255c. As above-mentioned, the bails are so controlled by the commodity and clerk keys that, upon depressing a commodity key 11 or 12 the bail 255a, or 255b respectively, and, upon depressing any clerk key 13, bail 255c is counter-clockwisely rocked. Pin 354 (Fig. 102) connects lever 353 to arm 256d which is counter-clockwisely rocked when keys 14 to 17 are depressed.

If, upon depression of a commodity or clerk or transaction key, the respective bail 255a-c and the arm 256d are counter-clockwisely rocked, the proper lever 333 (Fig. 103) or 343 (Fig. 95) or 353 (Fig. 102) is carried along which then rocks in counter-clock-

wise direction the levers 331, 341 and 351 respectively, connected therewith. Since for each machine operation, at least one of the keys mentioned above has to be depressed, one, at least, of the levers 331, 341, 351 will be rocked, which causes the lever 326 to be moved, by bail 328, into the path of the lower end of lever 325. If, thereafter, the motor bar 28 (Fig. 94) is depressed, and consequently lever 312 is rocked counter-clockwise, lever 325, connected to the lower end of the two-armed lever 317, cannot move. Consequently, through the movement of the arm 312 the two-armed lever 317 is rocked about its lower pivot in a counter-clockwise direction. In so doing, the stud 320 (Fig. 99) carries along the slide 321 against the action of spring 322.

A pin 361 of slide 321 is embraced by the forked end of lever 362 pivoted on a stationary stud 365. Lever 362 is rigidly connected to a hooked pawl 363, hook 364 of said pawl catching behind an extension 366 (Fig. 101) of a slide 367 shiftably attached to the transaction key bank. Spring 368, attached to slide 367, tends to pull down the slide which, normally, is prevented by hook 364 of lever 363. A differential lever 371 is pinned at 369 to the upper end of the slide 367. Stud 372 of said lever has connected thereto one end of a short link 373 and the other end of the link is connected to one arm of bail 375 loosely mounted on shaft 250 (Figs. 25, 26, 28, 29, 41, and 95). Normally, the horizontal traverse edge of said bail is faced by an extension 376 of arm 377 fast on shaft 60, said extension preventing the bail 375 from moving to the left. In addition, two projections 331a, (Fig. 103) 341a (Fig. 95) of the locking levers 331, 341 extend into the path of bail 375 which also prevent the bail 375 from moving to the left. The upwardly extending arm 377 reaches into the plane of a stop lever 378 loosely mounted on shaft 250 and is held by a spring 381 (Fig. 29) stretched between a pin 379 and a stud in the lever 378, in contact with the pin 379 of a lever 380 loosely mounted on shaft 250. Under the action of spring 382 (Figs. 26 and 29), lever 380 is held in contact with the round head of lever 384 (see also Fig. 30) which is connected by means of a tube 385 loosely mounted on the sleeve 309 on shaft 92, to a lever 386 (Fig. 97). The round head of said lever 386 is embraced by the forked arm 387 of a bail 388 loosely mounted on shaft 250. The other arm 389 of the bail has a pin 390 engaging under the action of spring 382 the upper end of a key slide 391 attached to the control bank. This key slide has inclined surfaces arranged thereon, so that it is moved downward by one unit upon depression of a multiple-item key 21, 22 or 23, or by a blind key 24 or 27 being operated by turning the lock 26 to "X" or "Z."

Thus by depressing a multiple-item key 21, 22 or 23, or by setting the lock 26 to "X" or "Z," the elements, including the slide 391, parts 380, 389, 388, 387 and the arm 386 (Fig. 97), sleeve 385 (Fig. 101), and arm 384, the lever 380 are rocked counter-clockwise, normally taking along lever 378 connected to it by a spring.

If an amount key is depressed, then, as above-mentioned, upon operating the motor key, the shaft 60 is rocked clockwise. Due to this movement arm 377 (Fig. 101) fast on shaft 60, will be so rocked that its extension 376 leaves the path of bail 375, while its upper end comes to lie before the downwardly extending projection of lever 378. Thus when an amount key is depressed,

lever 378 is prevented from following the lever 380 when rocked upon depression of a multiple-item key, or when the lock 26 is turned to "X" or "Z" respectively. Lever 378 has a projection 378a lying normally before the upper end of the differential lever 371 and thus preventing it from moving to the right.

As before-mentioned, spring 368 tends to pull the slide 367 downward but is unable to do so when no control key is depressed even if the motor key is depressed and the hook pawl 363 thrown out in the manner described, because the differential lever 371 is held against rotation in clockwise direction about stud 372 by means of the projection 378a which lies in the path of the upper end of the lever 371. A clockwise rotation of the differential lever 371 about its so supported upper end is prevented by bail 375 connected to said lever, which bail lies before the projection 376 of lever 377 and the extensions 331a, 341a of the locking levers 331, 341.

If, for recording a single-item transaction, a commodity key 11 or 12 and a clerk key 13 is depressed, the levers 331 and 341 are rocked in counter-clockwise direction so that by means of the bail 328 (Fig. 95) they position the locking lever 326 before the lever 325, and their projections 331a, 341a are moved out of the path of bail 375. As, at this time, at least one amount key is depressed, the rod 132 (Figs. 14, 15) is thereby secured against moving to the left, as per Fig. 15. If, then, the motor key 28 is operated, the first part of the movement so initiated causes, over the levers 135, 133, 136 (Figs. 87 and 88), the shaft 60 to rotate in clockwise direction, whereby the projection 376 (Fig. 101) of lever 377 is moved out of the path of bail 375, and the upper end of lever 377 is moved before the downwardly extending arm of lever 378. During the depression of the motor key, arm 312 (Fig. 94) moved thereby, rocks the two-armed lever 317 in counter-clockwise direction, that is, about its lower end which, due to the locking lever 326 lying before it, is not able to yield to the right. Consequently, slide 321 (Fig. 99) linked to stud 320 of the two-armed lever 317 has to move downward. Pin 361 of said slide 321 causes thereby the hook pawl 363 to be thrown out and thus the release of the spring loaded slide 367 (Fig. 101). As the projections 331a, 341a and 376 are out of the path of bail 375, and the differential lever 371 has its upper end bearing against the stop 378a, spring 368 pulls the slide 367 downward.

If, for recording an item of a multiple-item transaction, in addition to the keys 10, 11 or 12 and 13, a multiple-item key 21, 22 or 23 is also depressed, then, by means of the slide 391 (Fig. 97), yoke 388, arm 386, and arm 384 (Fig. 101), the lever 380 will be rocked clockwise. However, the lever 378, connected by a spring to lever 380, cannot be carried along at this time, as its rearwardly extending arm is held by lever 377 in rocked position. Thus projection 378a remains in front of the upper end of the differential lever 371 and arrests it there, while the abutments 331a and 341a are moved out of the path of bail 375. By depressing the motor bar, the shaft 60 is rotated due to which the projection 376 is moved out of the path of the bail 375, so that, if during the continued depression of the motor bar, pawl 363 is disengaged, spring 368 is able to move slide 367 downward, the differential lever 371 being rocked about its upper end.

If, in connection with the two machine opera-

tions just mentioned, neither a commodity key nor a clerk key had been depressed, neither of the two levers 331 or 341 will be rocked. As a consequence thereof, upon depressing the motor bar, the bail 375 will be held by one of the retained extensions 331a, 341a, and as the extension 378a lies before the upper end of the differential lever 371, spring 368 cannot pull the slide 367 downward although the hook pawl 363 has released slide 367.

At the end of item entry operations, for multiple-item entry transactions, the commodity, clerk (transaction) and multiple-item keys which were depressed remain depressed and, thus, also the parts operated by said keys remain in the operated positions. At the end of the said item entry operation, only the amount keys are released and therefore the shaft 60 and the lever 377 fast on it, are restored to initial positions. Due to this, lever 378, under the action of spring 368, is free to follow lever 380 previously adjusted, whereby its extension 378a is removed from the upper end of the differential lever 371. However, lever 377 being returned, its extension 376 is positioned before the bail 375. If, now, the motor bar is depressed, hook pawl 363 releases slide 367, which can be moved down by spring 368, since the upper end of the differential lever 371—rotating about the stud 372 held stationary—is able to give way.

The same occurs when for taking a total from one of the commodity, clerk or transaction totalizers, for which operation the lock 26 is turned to "X" or "Z" and a totalizer key 11—17 is depressed. By depressing one of these keys, one of the levers 331, 341, 351 is rocked and, thus, the locking lever 326 is positioned before the lever 325, so that upon depressing the motor bar 28 the hook pawl 363 is disengaged. Due to the fact that no amount key is depressed, the projection 376 of lever 377 remains positioned before the bail 375, while projection 378a is removed from the upper end of the differential lever 371, because lever 378 upon setting lock 26 to "X" or "Z" has been rocked by means of slide 391.

The key 14 (Figs. 21 and 34) which is to be depressed for the purpose of taking a sub-total or total from the "Cash" totalizer, is held locked during adding operations by a locking extension 525a of a locking lever 525 which is normally underneath the key pin 14a of this key. A slot of this locking lever is engaged by the roller 266 attached to the slide 267 of lock 26. If the lock 26 is set to "X" or "Z" pin 266 rocks the locking lever 525 to the right or left, so that its locking projection 525a is removed out of the path of the key pin 14a and, thus, the key 14 is depressible. By depressing this key, the key slide 290 (Fig. 102) is moved upward and, thus, over the parts 256d, 354, 353, 352, 351, 328, 327 the stop lever 326 is positioned before the feeler 325, so that the machine is released upon operating the motor bar.

To record a "Change" (No sale) transaction, it is necessary to depress only the "No sale" key 18 and key 12 of the respective clerk. Also in this event the motor bar has to be operated effectively. Depressing the clerk key causes, first, lever 325 to be supported as is necessary, by the locking lever 326.

As mentioned above, depression of the "No sale" key 18 prepares the shaft 60 for rotation, which is performed by depressing the motor bar, and thus lever 377 is rocked, which holds the lever 378 so that its extensions 378a support the up-

per end of the differential lever 371. At this time, the projection 376 of lever 371 is moved out of the path of ball 375 and, also, the projection 341a by virtue of depressing the clerk key. Moreover, the projection 331a has to be moved out of the path of the ball 375 which, in this case, is effected in a manner about to be described by depressing the "No sale" key.

By depressing the "No sale" key 18 and by means of the key slide 398 (Fig. 103) and link 397, the ball 396 is rocked. The left-hand support arm for this ball has attached to it an arm 356 which, when the "No sale" key is depressed, strikes pin 357 of link 332 whereby link 332 is moved down. By this the stop lever 331 is rocked in counter-clockwise direction till its stop 331a is outside the path of ball 375. Thus the ball 375 is free to move, and spring 368 pulls slide 367 downward, the differential lever 371 being free to rock about its upper end in clockwise direction.

The right-hand support arm of ball 396 carries a hooked arm 358 (Figs. 27, 29 and 41) which, when the "No sale" key is depressed, is moved before a pin 359 (Fig. 97) fast on arm 387 of ball 388. By this, with the key 18 depressed, pin 359 cannot move to the left and, thus, depressing a multiple-item key 21—23, as well as setting the lock 26 to "X" or "Z" is rendered impossible. On the other hand, the "No sale" key 18 cannot be depressed, when a multiple-item key is depressed, or the lock 26 is set to "X" or "Z," because this moves the pin 359 into the path of the hooked arm 358. However, key 15 or 17 is not prevented from being depressed because the hooked arm is rocked only half the distance by key 15 or 17 and, therefore, does not move into the path of pin 359 when one of these two keys is depressed.

Above is set forth the manner of releasing the slide 367 in connection with the different machine operations, so that said slide can be pulled down by spring 368 to release the machine for operation by mechanism now to be described.

By means of a link 401 (Fig. 101), the slide 367 is connected to a lever 402 (Figs. 25 and 28) rigidly connected by a tube 403 to the release ball 400 loosely mounted on shaft 200. The left-hand support arm 404 of the release ball carries a stud for a sliding block 405, which rotates on said stud. The block 405 (Fig. 100) slides within a slot of a locking lever 406. The locking lever is mounted on a stationary stud 407, and has attached thereto a spring 408 aiding spring 368. Under the action of a spring 412, an arm 410 of an angular lever, loosely mounted on shaft 200, bears on an arm 406a of lever 406. Another arm 411 of said angular lever faces the projection 406b of lever 406. By a link 413 (Fig. 25), the angular lever 410, 411 is connected to a machine locking lever 414 carried by a stationary stud 415. Normally, the one arm of the machine locking lever 414 lies under an abutment 418 secured to a gear wheel 417 pinned to the main drive shaft 50. Further, attached to the wheel 417 is a roller 419 to cooperate with an arm 416 of the machine locking lever 414. A spring loaded roller carrying lever 421 pivoted on stud 420 bears upon said arm 416.

If the motor bar 28 is depressed, and slide 367 is released and pulled down by spring 368, it rocks the release ball 400 in counter-clockwise direction aided by spring 408, and the locking lever 406 in clockwise direction. Thus the projection 406a releases the angular lever 410, 411 and under the action of its spring 412, the angular lever and

the machine locking lever 414, 416, rock in counter-clockwise direction. This movement rocks the arms 414, 416 out of the path of the abutment 418 and the roller 419 respectively. At the same time, the spring loaded roller carrying lever 421 can ride off the arm 416, thus coupling the motor and closing the motor circuit. In the following machine operation, the main drive shaft 50 is fully rotated. Near the end of this rotation, roller 419 strikes the arm 416 and restores thereby the machine locking lever to home position. At this time, also the lever 421 is lifted again and the motor circuit broken. Arm 414 of the machine locking lever stops the gear wheel 417 after a full rotation and thus stops the machine operation.

When, at the end of the machine operation, roller 419 restores the machine locking lever, the angular lever 410, 411, is also returned to and past its normal position. In so doing, its arm 411 strikes the projection 406b of the locking lever 406 and thereby restores to normal positions this angular lever, the release ball 400, the slide 367 and all the parts connected therewith. Slide 367 is locked by the pawl 363 dropping below the shoulder 366.

Arm 410 of the angular lever has a pin 424 (Figs. 15, 25 and 28) which, when this lever is rocked, is moved into the path of the projection 425a of slide 425. This slide is linked to an arm 426 fast on shaft 60 (Figs. 15, 31 and 40), and guided on a stationary stud 427, and thus is moved down when the shaft is rotated to the left. If an amount key or "No sale" key is depressed and, due to it, the slide 425 is moved down to the left, pin 424, upon releasing the machine, moves behind the flange 425a. By this the slide 425, and in connection therewith the shaft 60, which after the motor bar is released, tends to return to home position, are held in this position until near the end of the machine operation, and the pin 424 frees the slide 425 when the angular lever 410, 411 is returned to its normal or home position.

KEY LOCKING AND RELEASING DEVICES

Recesses 431 of a release ball 400 are engaged by projections 432a of locking hooks 432 loosely mounted on shaft 200 (Figs. 2, 23 and 28). Each hook lies in the plane of a spring actuated detent 433 adjacent to each amount and commodity key bank. The purpose of these detents is to hold the keys in depressed positions. When a key is depressed, its pin moves, first, the respective detent 433 upwardly, said detent being pulled down again under the action of a spring when the key is completely depressed. Then a hook of said detent catches over the key pin to hold the key depressed.

Each detent has a hook 434 engaged by the respective hook 432 when the release ball 400 is rocked. Thus, after the motor bar is operated, slide 433 cannot move upward, so that it is not possible to depress an amount or commodity key, and the depressed keys cannot be released until, at the end of the machine operation, the release ball 400 is returned.

Opposite the lower ends of the detents 433 of the amount key banks is situated a universal release ball 444 fast on the release shaft 445 (Figs. 2, 14 and 32). At the right-hand end, the release shaft 445 has secured thereto a lever 446 (Figs. 23 and 32) having a pin 447 embraced by a forked lever 448. Under the tension of spring 450, the other arm 449 of said lever engages pin

451 of the guide plate 452 carrying a release key 453 and being held in disengaged position by means of a spring 450. Upon depressing key 453, the release shaft 445 is rotated counter-clockwise over said linkage, and the release bail lifts the detents 433 of all amount key banks, and releases the amount keys.

Further, lever 446 carries a pin 455, normally lying in the elongated hole of a pulling rod 456. This rod is connected to a roller carrying lever 457 carried by the stationary stud 467. Roller 458 of said lever, under tension of spring 459, bears against cam 480 attached to a gear wheel 59a fast on the main drive shaft 50. Near the end of each machine operation, the cam 480 moves rod 456 to the right whereby the release shaft 445 with the release bail 444 is rocked counter-clockwise, and the amount keys are released.

A detent 435 (Figs. 5, 28, and 105) is also provided for each clerk and transaction key bank which cooperates in the same manner with a hook 436 and 437 respectively. The two hooks of these two key banks are rigidly interconnected by a yoke 438. The projection 436a of the hook of the clerk key bank does not fully occupy the recess 431 of the release bail 400. The space created thereby is sufficient to allow the release bail 400 to rock in certain circumstances without carrying along the two locking hooks. The hook 436 for the clerk key bank has a flattened pin 439 cooperating with a spring loaded pawl 441 so that, normally, the hook 436 is urged to the right by the inclined right-hand surface of pawl 441, the left-hand edge of its projection 436a bearing on the left-hand surface of the recess 431. If the motor bar is depressed and the release bail 400 rocked in counter-clockwise direction, the latter carries along by means of the projection 436a the hooks 436 and 437 for the clerk and the transaction key banks due to which the slides 435 and the keys of these two banks are held locked during the machine operation. While the hook 436 for the clerk key bank is rocked in, the pin 439 is moved under the left-hand inclined surface of the pawl 441, by virtue of which the two hooks for the clerk and transaction key banks are held in engaged position when the release bail is returned, unless these hooks are returned in a manner to be described. Keeping these hooks in locking position, and thus locking the clerk and transaction keys, is required when a number of items of a multiple-item transaction and a total thereof is to be recorded, because such total recording can be performed only with one and the same transaction and clerk keys depressed.

After taking a multiple-item total or recording a single-item transaction, the commodity, clerk and transaction keys are released. This is controlled by shaft 92 which is driven only when single-amount transactions are to be registered, or when multiple-item totals are to be taken. Arm 117 fast on shaft 92 (Figs. 23, 37, and 106) is connected by a link 463, an intermediate lever 464, and a link 465 to an angular lever 466, pivoted on stud 467. A stud 468 of the angular lever 466 carries a two-armed lever 469, the lower pin 469a thereof engaging a lever 471 carried by a stud 470 and connected by a link rod 472 to an angular lever 473 carried by a shaft 475.

The upper wall of an elongated slot of the pitman 474 is engaged by pin 473a and the upper end of said pitman is pivoted to a lever 476 mounted on the release shaft 445 and, by means

of a tube 477 connected to a release bail 478 (see also Figs. 23 and 32). Normally a spring 479 attached to pin 469a holds the linkage positioned as shown in Fig. 106. The upper end of the two-armed lever 469 carries a roller 481 lying within the plane but, normally, outside the path of the actuating cam 480 secured to wheel 59a.

In machine operations when shaft 92 is not operated, that is, when items of a multiple-item transaction are recorded, the angular lever 466 will not be rocked, and therefore the roller 481 remains outside the path of the actuating cam 480, so that the linkage, and the release bail respectively, is not actuated.

If, however, in a machine operation (single-item transaction or item total), in which the shaft 92 is rotated, the angular lever 466 is rocked counter-clockwise, stud 468 of said lever rocks the two-armed lever 469 about its retained pivot 469a until the roller 481 is in the path of the actuating cam 480. At the end of the machine operation, this cam encounters the roller 481 and, as at this time the shaft 92 and, in connection therewith, the angular lever 466 is held, cam 480 rocks the two-armed lever 469 in clockwise direction about stud 468. Over link 472, angular lever 473 and link 474, this movement is transmitted to the arm 476 and the release bail 478. The left-hand arm of the release bail 478 has a pin 478a (Figs. 22 and 32) which at this time raises the detent 433 of the commodity key bank, due to which the depressed commodity keys 11 or 12 are released.

In this connection it is mentioned that at the end of each machine operation, even if multiple-item transactions are to be entered, the detents 433 of the commodity and amount key banks are released from the hooks 432 in order to permit operation of the proper commodity keys. However, at this time, the commodity keys are not released automatically, but after multiple-item total taking they are released in the manner described, by means of the release bail 478 in connection with single-item transactions.

The release bail 478 has connected thereto two other release levers 484 (Fig. 105) and 486 (Fig. 27) and releases the clerk and the transaction keys. As mentioned already, upon depressing the motor bar and rocking the release bail 400, the locking hooks 436 and 437 are rocked into engagement with the extensions 435a of the proper detents 435, pawl 441 (Fig. 5) holding the two hooks 436 and 437 in set position even after the release bail 400 is restored. While entering items of a multiple-item transaction, the detents and, in connection therewith, the clerk and transaction keys are held locked by holding the hooks 436 and 437. At this time, the release bail 478 is not moved. A roller 484a (Fig. 105) of the release lever 484 has the inclined surface of an angular lever 485 bearing upon it, which lever has a pin 485a lying in the plane of the hook 436 of the clerk key bank. A projection 436b of the hook 436 comes into contact with pin 485a when the hook 436 is swung in. If in the above mentioned machine operation the release bail 478 with the release levers 484 and 486 are actuated, the roller 484a rocks the angular lever 485 in counter-clockwise direction. Pin 485a of said angular lever strikes then the projection 436b and restores the hooks 436 to their ineffective positions against the action of pawl 441, the two interconnected locking hooks 436 and 437 thus unlocking the two detents 435. If the release bail 478 continues moving, the release levers 484 and

486 lift the respective spring slides 435 and thus release the clerk and transaction keys.

The multiple-item key 21, 22 or 23 which is depressed for the entry of the first item of a multiple-item transaction should not be changed, until the multiple-item total taking operation is completed. Therefore, a device described hereinafter is provided which keeps the depressed multiple-item key locked during multiple-item entry operations and releases it only after the multiple-item total is taken.

The control key bank (Fig. 21) has attached thereto a spring actuated detent 488 (Fig. 96) for holding the operated key 21, 22, 23, or 25 in depressed position. During the machine operation, the keys 21, 22, 23, or 25 and the detent 488 are held locked by a locking lever 489 catching across an extension 488a of the detent 488. This locking lever is connected to a bail 492 loosely mounted on release shaft 445, by a link 491 and to a lever 402 (Fig. 98) by means of a link 493, lever 402 being integral with the release bail 400 and connected to the release slide 367. Consequently, the locking lever 489 is moved into locking position when the machine is released, and restored at the end of the machine operation. The lower extension of the detent 488 faces the roller 478b (Figs. 9 and 32) of the release bail 478 (Fig. 21), which is not actuated when multiple-item transactions are recorded. Due to this, the detent 488 will not be raised in connection with registering multiple-item transactions, and thus the multiple-item key depressed is not released. Since, upon depressing a multiple-item key, the key slide 120 (Fig. 9) is moved upward, also this slide is kept in its upper position owing to the fact that the multiple-item key is held depressed, in which position the locking surface 120a of said slide lies underneath the key pins of the keys not depressed. Consequently, in multiple-item total taking operations, it is not possible to operate another multiple-item key.

The locking lever 489 cooperates also with the locking projections 267a, 267b of slide 267 (Fig. 21) which, upon setting the lock 26 to "X" or "Z," is moved up or down respectively, by one unit. If the lock is in normal, that is, in adding position, the notch between the two locking projections 267a, 267b faces the flange of the locking bail 489, so that, when the machine is released, said flange can drop into said notch. If the lock 26 has adjusted the slide 267 into its upper or lower position, respectively, the flange of the locking lever is able to move under the locking projection 267b or across the locking projection 267a. Thus in all three cases, the slide 267 and the lock 26 are prevented from being moved during machine operation.

The link rod 456 (Figs. 23 and 104) actuated in each machine operation, has linked thereto a coupling member 495 which, by means of a link 496 and a two-armed lever 497, is connected to a slide 498 shiftably mounted on the control key bank. The teeth 498a of this slide are in mesh with the gear wheel 269 (see Fig. 86) of lock 26, and said slide is set by the latter, so that a slot of the coupling member 495, when the lock is in adding position, is opposite a pin 499 of the lever 476. Now, if the link 456 is moved to the right, the coupling member is carried along. However, it does not act upon the lever 476, as its pin 499 is opposite the slot of the coupling member. Thus the release bail 478 connected to the lever 476 is not moved. If, however, lock 26 is set to "X" or "Z," which causes the slide 498 and in connection 75

therewith the coupling member to be raised or lowered, then one of the working surfaces 495a or 495b of the coupling member confronts pin 499 on lever 476. When the link 456 is actuated, lever 476 is carried along by the coupling member 495 and the release bail 478 rocked thereby. From this it becomes evident that in "Reading" (X) and "Resetting" (Z) machine operations the depressed commodity, clerk or transaction keys are released.

As mentioned above, to reset any one of the totalizers, only one of the totalizer selecting keys can be operated at a time for which purposes the locking device 289, 293 (Figs. 4 and 19) is provided.

For total taking the amount keys are held locked against depression and the zero stop pawls 8 are moved out of the path of the amount differential members 32 (Figs. 2 and 14). The actuating slide 138 of each amount key bank (Fig. 93) has a pin 501 engaged by the proper zero stop pawl 8 under the action of a spring 502. If depression of an amount key caused the proper actuating slide 138 to move upward, pin 503 of the zero stop pawl 8 is moved out of the path of the amount differential member 32. In total taking the zero stop pawls 8 of each amount key bank are disengaged by a lever 505, pinned to shaft 200 and lying in the plane of a pin 504 of the appropriate zero stop pawl 8. At the left-hand end, shaft 200 carries an arm 508 (see also Figs. 25 and 28) which, under the tension of spring 509, bears against pin 510 of the angular lever 410 connected to the machine locking lever 414 (Figs. 25 and 28). When the machine is released, spring 509 tends to rock the shaft 200 and the locking levers 505 clockwise (Fig. 93). If an amount key is depressed, the extension 507 of the respective actuating slide 138 confronts the locking projection 506 of the allotted lever 505, and a clockwise rotation of shaft 200 with the locking levers 505 is prevented. If, however, no amount key is depressed, and the machine is released, spring 509 rotates the shaft 200 and the locking lever 505 in clockwise direction, the locking projections 506 of the locking levers catching over the extensions 507 of the actuating slides 138 and thus preventing depression of an amount key. Further, the rocking levers 505 strike the pins 504 of the zero stop pawls 8 and disengage them, so that the amount differential members 32 can be set under control of the totalizer wheels of the totalizer to be reset.

The transaction key bank has not allotted thereto a zero stop pawl. Hence the appropriate main differential member 32d (Fig. 27) moves,

either with the key 14 (Cash $\frac{X}{Z}$) depressed or not depressed, until it strikes the stationary "Cash" stop 19. Normally, in this position the totalizer "Cash" is selected, unless, additionally, a multiple-item key 21-23 is depressed. The multiple-item keys cause the selection of the multiple-item totalizer, independently of the setting of the main differential member 32d, in the manner hereinbefore described.

The zero stop pawls of the other commodity and clerk key banks are disengaged upon depressing a key in the respective bank. In taking a sub-total or total from one of the totalizers, only one totalizer key is depressed at a time, and hence, only the appropriate zero stop pawl and the proper differential device respectively, is freed, which causes the selection of the desired totalizer and the setting of the corresponding

printing character, while the rest of the special differential devices are held in zero positions. As before-explained, after the entry of each item of a multiple-item transaction, the commodity, clerk and transaction keys remain in depressed position. Therefore it is not necessary to depress these keys when preparing the machine for multiple-item total-taking operations. The totalizers associated with the depressed commodity and clerk keys are prevented from being thrown in, because owing to the fact that an amount key is not depressed, the respective stop arms 244a-c are not aligned with the upper arms of the three-armed levers 242a-c (Fig. 4) due to which, as set forth already, the engaging means of the respective totalizer rows move idly. The main differential members 32a, 32c of the allotted differential devices would be able to adjust themselves during total taking operations, which occur in the clerk key bank, to adjust the respective clerk initial. However, the type carrier of the article sold, is not adjusted during total taking operations even though the commodity key is kept depressed, since the article symbols are printed only in connection with item entry transactions. For this reason, in multiple-item total recording operations, the differential device of the commodity key bank is held in zero position by a special zero stop pawl 511 confronting an extension 522 of the main differential member 32a (Figs. 22 and 82). This special zero stop pawl 511 is loosely mounted on shaft 60 and is rigidly connected to a lever 512. The latter has an L-shaped slot 513 engaged by the roller 514 of a lever 515 loosely mounted on the shaft 250. Spring 516 stretched in between the levers 512 and 515 tends to keep the roller 514 always in contact with the right-hand lower corner of the slot 513. An extension 517 of lever 512 engages pin 518 of lever 136 fixed to shaft 60. Pin 519 of lever 515 lies within the path of a cam disc 520 secured to shaft 521 which is rocked counterclockwise when lock 26 is turned to "X" or "Z" by disc 282 (Fig. 4), link 1169, and an arm 1168 pinned to shaft 521. The manner of rocking disc 282 is hereinbefore described.

As in connection with each amount entering operation, a commodity key is depressed, the normal zero stop pawl 8 of the commodity key bank is disengaged, and as, due to the depressed amount keys, shaft 60 is rotated, pin 518 of lever 136 carries along the slotted lever 512, thus moving the special zero stop pawl 511 out of the path of extension 522. Thus, in amount entering operations both zero stop pawls of the commodity key bank are rocked out of effective positions, so that the differential device will be adjusted in accordance with the commodity key depressed. In taking multiple-item totals, the commodity key is held depressed, but no amount key is in depressed position. Due to this, shaft 60 will not be turned and hence the special zero stop pawl 511 not be disengaged. Thus, the differential device is held in zero position, and for this reason no commodity character will be set up. The type wheel of the check printer allotted to the commodity key bank, bears in zero position the word "Total" which thus is printed in connection with each multiple-item total.

In taking a total or sub-total from any of the classification totalizers, the cam disc 520 is rotated by means of the lock 26, and by this, the lever 515 is rocked clockwise. The roller 514 on the lever 515 thereby rocks the slotted

lever 512 in clockwise direction, and causes the special zero stop pawl 511 to be disengaged. If, in connection with this machine operation, no commodity key is depressed, the appropriate zero stop pawl 8 holds the differential device in zero position owing to which the word "Total" is printed beside the total amount. If, however, a commodity key is depressed, the normal zero stop pawl 8 of this bank is disengaged and the desired commodity totalizer can be selected and thrown into engagement for total taking purposes.

SPECIAL COUNTERS

A shaft 530 (Figs. 2, 35, and 107) has mounted thereon groups of special counters for analyzing the transactions by counting the number of entries made. From the left (Figs. 1 and 35) the first group comprises nine counters to count the articles D-V sold. The next group comprises five clerk counters 1 to 5, counting the number of the customers served by the different clerks. A third group of counters counts the business transactions according to their different characters (Cash, Received on account, Charge, Paid out). A total counter is also provided.

Each numeral wheel 531 of the transaction counters has connected thereto a ratchet wheel 532. Each transaction counter is advanced by one unit when the carrying pawl 533 of known type (Figs. 2, 5, 23, 35, and 107) is actuated. In order to actuate only those counters which are assigned to the transactions entered, the carrying pawls are operated as follows:

Each bail 534, carrying the pawls 533 for the article counters, has attached thereto a link 535, the other end of which has linked thereto a link 536 mounted on a cross bar 537a (Figs. 2 and 35). This cross rod is supported by two arms 538a secured to shaft 475. The right-hand end of shaft 475 carries an arm 541 (Fig. 23) which, by a rod 542, is connected to a two-armed lever 543 pivoted on stud 545 of an angular lever 544 and having a roller 543a being urged by a spring 546 attached to rod 542, toward the circumference of cam disc 460. A stationary stud 547 carries the angular lever 544 connected by a rod 548 to a two-armed lever 549 pivoted on a stationary stud 550. Within the plane, but normally outside the path, of the two-armed lever 549, there is arranged a locking arm 552 secured to shaft 60, which is rotated in each amount entering operation, and which moves the locking arm 552 into the path of the two-armed lever 549. Pivot 554 of the two rods 535 and 536 carries another link 555, having a stud 556 guided in a slot 557 radially extending relatively to a partition 558. In the plane of each stud 556 of the nine article counters, cam discs 561-569 are provided, which are arranged in staggered position (see Figs. 5 and 34) on a helical line on a tube 570a secured to shaft 560. At the right-hand end, tube 570a carries a gear wheel 571a meshing with wheel 572a pinned to shaft 573a. Another wheel 574a pinned to shaft 573a meshes with an intermediate wheel 575a which in its turn meshes with a toothed segment 576a carried by stud 94c. By a rod 577a, the toothed segment 576a is connected to an arm 578a carried by the shaft 80, said arm being connected by a sleeve to a wheel 89a. Each time the differential device of the commodity key bank is differentially positioned, in the manner described, the gear wheel 89a is positioned according to the commodity key depressed. Owing to the arrangement described,

the tube 570a is adjusted by the differential device of the commodity key bank. This positions the cam disc 561—569 associated with the depressed key in front of the stud 556a of the counter that is associated with the article key depressed.

During adding operations, after the counter associated with the depressed article key is selected, the cam disc 460 advances the selected counter by one unit in the following manner.

In adding machine operations shaft 60 is rotated, by which the locking arm 552 is moved into the path of the two-armed lever 549, and thus the angular lever 544 is prevented from rotating in counter-clockwise direction. If, now, the cam disc 460 moves the roller 543a to the left, the two-armed lever 543 rotates counter-clockwise about stud 545. The latter, by means of the link 542, rotates the shaft 475 and the cross rod 537a carried by it, also in counter-clockwise direction (Figs. 2, 5, 23, 35). By this means, the rods 536 of all article counters are actuated. However, the counters associated with the studs 556 which are not arrested by cam discs 561—569, are not actuated, because such studs moved idly in slot 557. The carrying pawl 533 of the counter which has its associated stud 556a lying opposite a cam disc 561—569, will be actuated when shaft 475 is rotated because when the stud 556a is arrested and the link 536 is pulled down, the link 535 is moved to the left to operate the timed carrying pawl 532 connected therewith. In this manner the corresponding article counter is advanced by one unit.

If shaft 60 has not been rocked, for instance during total taking, the two-armed lever 549 and, in connection therewith, the angular lever 544 are not locked against counter-clockwise rotation. Normally the levers 544 and 549 are held, by means of a light spring 559, in the position shown (Fig. 23). When, under these conditions, the cam disc 460 drives the two-armed lever 543, these levers are moved against the action of the light spring 559, so that the two-armed lever 543 is rocked about its lower pin, having attached thereto the rod 542 under the tension of the strong spring 546, but not actuated in this instance. So it becomes evident that the article counters are operated only in connection with adding machine operations (single-item and multiple-item transactions), and then only those counters which are allotted to the article key depressed at a time.

The five clerk counters 1 to 5 and the article counters are constructed alike. The corresponding parts of said counters have the same reference numerals and the letter "c" is added to those of the clerk counters.

The cross rod 537c (Fig. 35) for actuating said counters, is carried by two arms 538c secured to a tube 580 loose on shaft 475. At the right-hand end, this tube carries an angular lever 473 which, as mentioned above, is actuated by shaft 92 only in single-item transactions and item-total taking operations. The cam discs 581—585 cooperating with the studs 556c of these counters, are arranged in staggered position on a helical line on a tube 570c and are positioned in accordance with the clerk key depressed each time by the differential device of the clerk key bank in the same manner as the cams 561—569 are set by the commodity differential mechanism. Consequently, the counter associated with the clerk key depressed, would be actuated each time a single item transaction and a multiple item total

is recorded. This, however, is not desired, as the clerk counters are provided to count only the transactions where a customer purchased one or more articles, that is, the cash and charge sales of the individual sales persons. To this end, the tube 570c with the cam discs 581—585 are axially shiftable. In between the two cam discs 581 and 582 an arm 597 with a roller 598 is rotatably but unshiftable mounted on the tube 570c. The roller 598 engages into the cam groove 599c of a roller 599 fixed to the left-hand end of the tube 573d, which, over the parts 574d—577d, is connected to the differential device of the transaction key bank and consequently by this differential device positioned according to the transaction key operated. The cam groove 599a (Fig. 36) is so shaped that in accordance with the different characters of the transactions, tube 570c is positioned as follows:

In cash and charge operations, it is in left hand effective position; in "Paid on account," "Paid out" and "No sale" operations, it is in right-hand position; the cam discs 581—585 lying outside the plane of the studs 556c. Tube 570c carries a toothed wheel 571c by which tube 570c is rotated, by the differential device of the clerk key bank into position corresponding with the depressed clerk key. Said wheel is so wide as to come, when the tube 570c is shifted, in engagement with the proper gear wheel 572c. Due to this arrangement the clerk counters count only the registered cash and charge sales of the individual sales persons, that is, the single-item transactions and the multiple item-totals registered. The total of the transactions indicated by all the clerk counters is the total of the customers served by all the sales persons.

The cross rod 537c actuating the clerk counters extends also into the range of the transaction counters and the total transaction counter. As mentioned above, this cross rod 537c is actuated in registering single-item transactions and item totals; thus the allotted counters are operable only in connection with such machine operations. Over the parts 89d, 570d—577d, the counter to be operated is selected in the described manner by the appropriate differential device of the transaction key bank, in that thereby the tube 570d with the cam discs 591—594 is turned so that a cam disc 591—594 is opposite the stud 556d of the counter to be operated each time. Thus each transaction counter counts the transactions of one and the same character, respectively, that is, single-item transactions and multiple item totals.

The tube 570d has fixed thereto also a sound disc to arrest the stud 556d for the "total" counter in each machine operation. Since the cross rod 537c is actuated only in single-item transactions and multiple item total taking operations, the total transaction counter counts all the "Cash," "Paid on account," "Charge" and "Paid out" transactions, so far as single-item transactions and multiple item totals are concerned.

The disc 595 may also be shaped so that it does not support the stud 556d unless tube 570d is set to "Cash" or "Charge." Then the total counter would count only the actual sales, that is, single-item transactions and item totals, so that the total counter shows the total of the customers served who actually made purchases.

Two counters 1560 and 1561 (Figs. 1, 23, and 24) are provided to count the number of times the lock 26 is operated. The lock 1560 counts

the number of times the lock 26 is moved into the "X" or sub-total position, and counter 1561 counts the number of times the lock 26 is moved into the "Z" or reset position. The locks are actuated through suitable connections with the slide 498, which slide is, as before described, moved upwardly when operating the lock 26 for sub-total operations, and downwardly when the lock 26 is operated for resetting operations. The counters are of the well-known type which moves the units wheel one step each time the central shaft is oscillated. The connections for oscillating the shaft may consist of any form of projection on the slide, such as a stud or flange, which engages an arm on the counter shaft to move the shaft in one direction, and a usual spring returns the shaft to its original position.

INDICATING DEVICE

A small gear wheel 1201 is in mesh with each gear segment 37 connected to the amount differential mechanisms (Figs. 2, 42, 43, 44 and 45), said segments being directly moved from the previous set position to the new position according to the keys depressed during each machine operation. All wheels 1201 are mounted on a shaft 1200 and each wheel is rigidly connected to a helical gear 1202 in mesh with another helical gear 1203. Each gear 1203 is fast on a shaft 1205 vertically extending from a support plate 1204, the upper end of said stud having pinned thereto a gear 1206. The gears 1206 of the different denominational orders are arranged at different heights, and each meshes with two horizontally located racks 1207, 1212 shiftably mounted on guide pins 1211. Each rack of these pairs of racks 1207, 1212 is in mesh with a gear 1208 and 1213, respectively, secured to the lower end of a square shaft 1209 and 1214, vertically mounted on the frame 1216 of the indicating device. Each of these square shafts 1209, 1214 has shiftably, but unrotatably, mounted thereon indicators 1210 and 1215 respectively which will be detailed later. Owing to the connection set forth above, the setting motion of each gear segment 37 is transmitted to the two appropriate square shafts 1209 and 1214 whereby the indicators 1210, 1215 mounted on these shafts are adjusted.

The square shafts 1209, 1214 are arranged in two rows, so that the indicators 1210 and 1215 are readable from the clerk and the customer sides respectively, that is, the indicator for the highest denominational order is situated to the left, and that for the lowest order farthest to the right (Fig. 42).

Each indicator comprises two hollow pentagonal prisms dimensioned alike which are in staggered relation so that the edges of the one prism are alined with the centre line of the surfaces of the other prism, and that the corners of the one prism protrude over the surfaces of the other. Thus the ten surfaces formed thereby bear the numerals or characters. The even digits are disposed on the upper and the odd digits on the lower surfaces, so that when tripped, the prisms are to be turned only by half the width of a show surface (one tenth of the revolution). Shaping the indicators in such a way produces large surfaces to accommodate thereon the numerals or characters without requiring much space.

To indicate the commodity characters and clerk initials, such indicators 1210a, 1215a and 1210c, 1215c are provided, which are adjusted in

the manner set forth above in connection with amount indicating, by the corresponding gear segments 37a and 37c. The only difference consists in that, instead of racks 1207, 1212, small intermediate wheels 1207a, 1212a and 1207c, 1212c are provided. The corresponding parts of the setting device have the same reference numerals and have added thereto a and c respectively.

To hold the indicator prisms in normal and operative positions, respectively, an alining mechanism is provided. To the upper ends of the square shafts 1209, 1209a and 1209c as well as shafts 1214, 1214a and 1214c for the front and rear prisms respectively, notched discs 1218 are provided. According to the ten setting positions, each disc 1218 has ten notches, and, normally, one of these notches is engaged by a pin 1219 to prevent rotation of the square shafts. Pins 1219 are carried by a slide 1220 shiftably mounted on a frame 1216. The slide has a bent over forked arm 1220a embracing a pin 1221 of an angular lever 1222 connected by a link 1223 to a lever 1224 on a stationary stud 1225. Connected to the lever 1224 (Fig. 23), is a pulling rod 1226 guided on a stud 1227. The rod has a roller 1226a engaging a groove of a disc 1228, carried by stud 1227, and given a counter-clockwise revolution during each machine operation.

The groove is so shaped that normally through the linkage above described the slide 1220 is held in its left-hand end position, in which its pins 1219 rest in the respective notches of the discs 1218, thus preventing rotation of the square shafts and the indicators. Only while the indicators are being set, that is, rotated, the cam disc 1228 moves the pins 1219 of the slide 1220 out of the notches of the discs 1218 and locks them again after they have been set to their new positions.

Upon rotating the indicators into indicating positions, the even digits are shown on the upper prism and the odd digits on the lower prisms. In order to lift all numerals set to the same level, a lifting and lowering device is provided for the indicators:

Normally, all indicators are in their lower positions, their downward extending hubs bearing on the front and rear bar 1230 respectively, of the lifting frame. At each end these two bars are interconnected by a traverse bar 1231 (see Fig. 2), so as to form a lifting frame, carried by two arms 1232 secured to a shaft 1235. By means of pins 1233 formed on the two traverse bars 1231, and sliding in the vertical slots of the indicator frame 1216, the lifting frame, upon rocking the arms 1232, is guided in vertical direction. In addition to the arms 1232, another arm 1236, (Fig. 23), is fast on shaft 1235, which arm is connected by a link 1238 to a lever 1239. This lever is carried by stud 1240 and has a roller 1241 engaging into a cam groove of disc 1242 mounted on stud 1227. By this disc the bars 1230 and in connection therewith also all indicators 1210 and 1215 are, first, lifted. In raised position, the indicators are properly adjusted by virtue of rotating the square shafts 1209 and 1214, slide 1220 with the pins 1219 being in ineffective position.

At the upper closing surface, the indicator prism has five lugs 1244 (Fig. 42), each being situated above the centre of each upper surface. Extensions 1245 of the slide 1220 are in position to cooperate with the lugs 1244 of the indicator prisms, one extension 1245 being provided for each indicator.

If one of the indicators is set to show an odd

digit, and the slide 1220 is moved to the left for the purposes of locking the square shafts, then the proper extension 1245 of slide 1220 moves under the respective lug 1244 of this indicator, while the lugs 1244 of the indicator of an even digit lie outside the path of the pertinent extensions 1245. Now, if the bars 1230 are lowered by the cam disc 1242, the indicator prisms set to show an even digit, share this downward movement, while the indicators set to show an odd number are held in their upper positions due to the cooperation of the lugs 1244 and the projections 1245. The numerals and characters set of the amount, commodity and clerk indicators are aligned so that they are readable through windows in the indicator plate 1246, that is, they are readable by the clerk and by the customer as well.

For the purpose of indicating the character of the transaction dealt with at a time, a front and rear pentagonal prism 1209d and 1214d respectively, are provided, which are secured to horizontally arranged square shafts 1151 (Fig. 44). Near the left-hand end of each shaft 1151 gear wheels 1152 are fastened which mesh with a universal gear segment 1153. This gear segment is, by means of a link 1154, connected to the setting segment 37d, which, in the manner described, is set according to the transaction key depressed. As a consequence, the two indicator prisms 1209d and 1214d are adjusted accordingly.

After setting, these two prisms are held locked. To this end, the left-hand end of either square shaft 1151 has secured thereto a notched disc 1155, able to cooperate with a pin 1156 at the lower end of a two-armed lever 1157. In between the upper arms of the two levers 1157 a spring 1158 is stretched to urge the pins 1156 of these two levers into the opposite notches of the discs 1155 to thus secure these indicators against rotation. With the machine in rest position, this locking is effected, as the indicators maintain the position set during the previous machine operation. At the start of the new machine operation, this locking is disabled to allow the indicators to be adjusted to the new positions. Slide 1220 causes the indicator prisms 1209d, 1214d and the shafts 1209, 1214 to be unlocked. When this slide is moved to the right, its two rollers 1159 encounter a sloped bent over portion of each lever 1157 and urge these levers apart against the tension of spring 1158. This causes the pins 1156 to be lifted out of the notches of the discs 1155 and the indicators 1209d and 1214d to be freed for adjustment, until slide 1220 again returns into locking position.

When a subtotal or total is taken from one of the totalizers (except the multiple item totalizer), it is not desired to show the total. For this reason, in such machine operations, the openings in the indicating devices are covered by a flash 1161 (see Figs. 44 and 45) on each side. Both flashes are secured to a slide 1162 shiftably mounted in vertical direction on pins 1163 of the indicator frame and, normally, held by a spring 1164 in its lower position. Slide 1162 has attached thereto a carrying pawl 1165 which under the action of a spring 1166 bears on lever 1167 fast on shaft 521. Further, shaft 521 has secured thereto a lever 1168 (Fig. 4) which, by means of a link 1169, is connected to disc 282 rotatable on shaft 260. When the lock 26 is turned to "X" or "Z," disc 282 is clockwise rotated. Said disc rotating, shaft 521 and the lever 1167 are clockwise rocked (Fig. 45) and

thereby an arm of the pawl 1165 is moved into the path of the lower guide pin 1233 of the lifting frame 1230, 1231.

The lever 1167 is, by a link 1171, connected to a locking lever 1172, pivoted on a stationary stud 1173, and an upwardly extending flange of the lever 1172 lies in the path of a pin 1174 of a pawl 1175. The pawl 1175 is pivoted on an angular lever 1176 and the pawl is normally held by a spring 1177, in contact with the angular lever 1176, said spring tending to rotate the pawl in clockwise direction. The angular lever 1176 is carried by pivot 1178 and held by a spring 1179 in contact with a stationary stud 1180. With the parts so positioned, an extension of pawl 1175 is outside the path of the upper guide pin 1233 of the lifting frame 1230, 1231.

With the lock 26 in normal position, the parts are positioned as set forth above and shown in Fig. 45, in which position neither pawl 1165 nor pawl 1175 extends into the path of the lower and upper guide pins 1233, respectively, of frame 1230—1231. As a consequence, the frame 1230—1231, when moving up and down during each machine operation, does not carry along slide 1162 with the flashes 1161, but maintains its lower position.

If, however, upon setting the lock 26 to "X" or "Z," the pawl 1167 is moved clockwise to cam pawl 1165 into the path of the lower guide pin 1233, the guide pin 1233 when moving upwardly carries along the slide 1162 and the flashes 1161 until they cover the openings of the indicating device. Near the end of this upward motion, pin 1181 on slide 1162 engages the sloped surface of the angular lever 1176 and rocks it in clockwise direction until pin 1181 is caught by a shoulder of the angular lever, and thus the slide 1162 with the flashes are held in raised position, in which position the flashes hide the indicators.

Also, by setting the lock 26 to "X" or "Z," the locking lever 1172 is rocked clockwise until its locking edge is moved in front of a pin 1174 of the pawl 1175 thus preventing the extension of pawl 1175 from moving into the path of the upper guide pin 1233 of the lifting frame, when the angular lever 1176 is rocked, spring 1177 being then tensioned. When the lifting frame is lowered again, the slide 1162 with the flashes 1161 does not follow, since its pin 1181 is held by the notch of the angular lever 1176 in its upper position. So long as lock 26 is in "X" or "Z" position, the indicators are invisible.

When the lock 26 is restored to normal position, over the shaft 521, the locking lever 1172 is returned and thereby pin 1174 is freed, so that the spring 1177 is able to rock pawl 1175 in clockwise direction. This rock motion causes the extension of pawl 1175 to move into the path of the upper guide pin 1233 of frame 1230—1231. Hence, in the following machine operation, this upper guide pin 1233 strikes the extension of pawl 1175 and rocks the angular lever 1176, which at this time releases the pin 1181 of the slide 1162. As a consequence, slide 1162 with the flashes are lowered to uncover the indicator openings.

PRINTING DEVICE

All amounts entered into the machine, are printed by means of the printer attached to the machine, upon an audit strip, and upon checks issued from the machine, or on inserted receipt slips. For printing upon these three sorts of record materials, there are provided three print-

ing mechanisms, each printing mechanism having three type wheel sets I, II and III (Fig. 46A). These three type wheel sets are adjusted by means of a universal set of wheels actuated by the set segments 37, 37a—d of the differential devices.

In each machine operation, the set segments 37, 37a—d (Figs. 2, 5 and 7) of all the amount and special differential devices are adjusted to the value represented by the keys depressed at a time. By a tube 701 mounted on shaft 260, each set segment is connected to a gear segment 702 (Figs. 48 and 50) which, over a double gear segment 703, is in connection with the exterior teeth of a ring gear 704. In this manner, each key bank and each differential device group, is in connection with a toothed ring 704. Further, the date wheels 708 arranged under the cabinet lid 709 are connected to gear rings 704 by means of tubes 707 and gears 705 and 706.

In order not to subdivide the wheels twelve times for printing the months but to divide them also ten times only, the following mechanism is provided for:

To set up the printing characters of the twelve months, two wheels 708a, 708b (Fig. 49), subdivided into ten spaces, are provided instead of the usual twelve-space wheels. These two months wheels and, accordingly, also the two appropriate months printing wheels bear the letters and type respectively, displayed thereon in the manner shown in Fig. 49, and by setting the wheels properly all months can be set up.

All toothed rings 704 are rotatably mounted on discs 711 (Fig. 48) having discs 712 greater in diameter than discs 711 (Fig. 50) interspersed therewith. The discs 711 and 712 are fixed to the left-hand end of a shaft 710 and form, in effect, a cylindrical body with annular grooves for the gear rings 704 to rotate therein. At the right-hand end, shaft 710 has secured thereto another packet of discs 713 and 714, the discs 713 being of greater diameter than discs 714, so that this packet of discs in effect forms a cylindrical body with annular grooves for gear rings 715, which rotate therein. The shaft 710 and the packets of discs 711—712 and 713—714 form a support of a setting unit, said support being secured against any movement by a supporting plate 716, pinned to the shaft 710 and screwed to the side wall 5.

The two disc packets of the setting support have eight bores arranged on a circle, concentric to shaft 710, and running parallel to said shaft (Figs. 46A, 48 and 50). Each disc 11 has a bore of such a diameter that a pinion 721 is able to rotate therein. This small pinion is constantly in mesh with the interior teeth of the appropriate gear ring 704 and is secured to the end of a shaft 722 extending through the respective bores of the two disc packets, the other end of said shaft having fastened thereto a gear wheel of same diameter which lies in the bore of a disc 714, and meshes with the interior teeth of the appropriate ring gear 715. Each shaft 722 has mounted thereon a tube 725, the left-hand end of said tube having secured thereto a gear 724 which meshes with the interior teeth of the proper ring gear 704. At the right-hand end, each tube 725 has secured thereto a pinion 726 meshing with the interior teeth of the proper ring gear 715. In this manner, each ring gear 704 is permanently connected with a ring gear 715.

The exterior teeth of the rings 715 mesh with

one, two or three type wheels rotatably mounted on shafts 731, 732 and 733 arranged parallel and concentrically to shaft 710.

Shaft 732 (Fig. 50) carries a complete set of type wheels 741b—747b, which, starting from the right, comprises first the date type wheels 741b, to be adjusted by the set wheels 708. Next to the date wheels is a set of type wheels 742b for the consecutive numbers to be advanced in a manner to be described hereinafter. The next two type wheels 743b and 744b are adjusted by the special differential devices of the clerk and commodity key blanks, respectively, through the gear segments 37a, 37c and the parts 701—704—721, 726 and 715 in accordance with the clerk and commodity key depressed. In the same way, the amount type wheels 745b, and the two type wheels 746b and 747b are adjusted by the differential devices of the transaction key banks and the control key bank respectively. This type wheel set mounted on shaft 732 is allotted to the slip printer.

The type wheel set mounted on shaft 733 (Figs. 46A and 50) comprises type wheels 742c—747c for printing all the above data except the date, and is provided for printing on the audit strip.

Shaft 731 (Figs. 46A and 50) carries only five amount type wheels 745a, the clerk and commodity character wheels 743a and 744a and the transaction character wheels 746a to print these data on the check. As the check is not wide enough to have the consecutive number and the date printed on one and the same line, the type wheels 741a and 742a for these data are mounted on a special shaft 748 (Figs. 46A and 51). The date type wheels 741a are connected, by tubes 751 and 754, and gears 752 and 753 to intermediate wheels 755 meshing with the proper ring gears 715. In the same manner, by tubes 756 and 759 and gear wheels 757 and 758 the consecutive number wheels 742a are connected to intermediate wheels 760 in mesh with the appropriate ring gears 715.

CONSECUTIVE NUMBERING

Each gear wheel 758 (Figs. 51 and 110) is connected to a ratchet wheel 761. The latter cooperates in a well known manner with a spring actuated stepped carrying pawl 762 (see also Fig. 54), which is mounted on a bail 763 rotatable about shaft 750. A slot in the bail 763 is engaged by a pin 764 of an angular lever 766 carried by shaft 765. A pin 767 of the angular lever carries a link 768, the lower end of the latter having connected thereto an arm of a bail 769 carried by a stationary stud 770. The angular lever 766 has attached thereto a spring 771 keeping the bail 769 in contact with a stud 772 and, in connection therewith, keeping the parts normally positioned as shown in Fig. 110. Bail 769 carries a pin 773 extending into the path of a pitman 774 linked to an arm 775. A stud 775 connects the arm 775 to a lever 776, having rollers 778 and 779 which cooperate with cam discs 781 and 782 rotatably mounted on a stationary stud 780 (Figs. 54 and 55). These cam discs are rigidly connected to gear wheels 783 and 784. Wheel 784 meshes with a wheel 785 actuated by the main shaft 50. Due to this drive the roller carrying lever 776 and, in connection therewith, the pitman 774 are moved up and down during each machine operation. By means of a link 791, the pitman is connected to a pawl lever 792, cooperating with a locking lever 793

(Fig. 109) pivoted at 777. A spring 794 urges the locking lever 793 towards the circumference of a cam disc 795 mounted on stud 780, the said disc being given a clockwise rotation during each machine operation, so that the locking lever 793 is removed from the pawl 792 during each machine operation. At this time, spring 796, attached to the link 791, tends to rotate pawl 792 in counter-clockwise direction which, however, primarily, is prevented by a pin 797a of an arm 797, rigidly connected to the pawl 792, engaging the upper end of a slot in a link 798, which is linked to an angular lever 799 secured to shaft 92 (see also Fig. 71).

If the pitman 774 is left in the position shown in Fig. 54 at the end of the previous machine operation, then, at the start of the new machine operation, by means of the cam discs 781 and 782, the pitman 774 is moved downwardly, and the carrying pawl bail 763 actuated by means of the bail 769, the link 768 and the angular lever 766; and, thus, the consecutive number advanced one unit. The cam discs 781 and 782 move the pitman 774 upwardly again, and a short time afterward, the parts 769—762 which are operated for advancing the consecutive number counter wheels, are restored to normal positions by the spring 771.

If a single-item transaction is to be registered, shaft 92 is counter-clockwisely rotated and thereby the link rod 798 is lowered until the upper end of the slot in the link contacts stud 797a. Shortly thereafter, the cam disc 795 removes the locking lever 793 from the pawl 792. Now, the spring 796 tends to rock the pawl 792 in counter-clockwise direction, which, however, is not possible, as pin 797a of lever 797 engages the upper end of the slot of the previously lowered link 798. Near the end of the machine operation, the cam disc 795 releases the locking lever 793 which moves in front of the nose of the pawl 792 which was not rocked, because it was arrested by stud 797a, and maintains it in the position shown in Fig. 109, when the shaft 92 is turned back to normal, and after the link 798 is raised again. The parts then occupy the initial position illustrated in Fig. 109 until the next machine operation is started.

When the first item of a multiple-item transaction is entered, at the start of the machine operation the pitman 774 by means of the cam discs 781, 782 is moved first downwardly, and then upwardly again. Thus the consecutive number is advanced by one unit. Since, in connection with such registrations, shaft 92 is not rocked, the link 798 maintains the position shown and its slot permits the arm 797 and the pawl 792 to move in counter-clockwise direction if the locking lever 793 is disengaged from the pawl 792. By rocking the pawl 792, pitman 774 is removed from contact with the pin 773. At the end of this machine operation, when the cam disc 795 releases the locking lever 793 to the action of the spring 794, the lever 793 engages the nose of the pawl 792 which at that time is in its rocked position. As the shaft 92 is not rocked in this machine operation, pawl 792 and pitman 774 remain in their moved or ineffective positions. Consequently, in the following machine operation, the consecutive number is not advanced, as the pitman 774, when actuated, does not move bail 769. This also occurs in all the succeeding machine operations, unless shaft 92 is rocked, that is, each time an item of the multiple-item transaction is entered. Now, when the multiple

item total is taken, the consecutive number will not be advanced, because the pitman 774 is still in its moved or ineffective position where it was left during the previous machine operation. During the multiple item total taking operation the shaft 92 is rocked and thereby the link 798 lowered and the pawl 792 is restored in clockwise direction by the arm 797. Thereafter the locking lever 793 is restored to its normal position under control of the cam disc 795, and said lever moves into the path of the nose of the pawl 792, keeping it in normal position, even when the link 798 is again raised by shaft 92. Through the pawl 792, the pitman 774 also is moved into effective position above pin 773, so that it advances the consecutive number in the next machine operation. So it is evident that advancing the consecutive number is prepared in each machine operation in which shaft 92 is moved, and the advancement of the consecutive number device is accomplished in the next succeeding machine operation, so that the individual registrations are numbered as shown in Fig. 64.

The shaft 765 carries four reset wheels 810 (Figs. 46A and 51) meshing with the ring gears 715 allotted to the consecutive number, and, as a consequence, the wheels 810 and the consecutive number type wheels 742a—c, are set like extents by said ring gears. The reset wheels 810 are provided with spring actuated pawls 811, bearing on the circumference of shaft 765. The shaft also has a longitudinal groove 812. By means of a reset key 813, which is inserted into the machine in such a manner as to be coupled to shaft 765, the shaft 765 can be rotated clockwise (Fig. 46A), whereby, in a well known manner, the wheels 810 are restored to zero by the groove 812 cooperating with the pawls 811. Through the ring gears 715, the consecutive number wheels 742a—c are set to zero when the key 813 is rotated to rotate the shaft 765.

A full stroke pawl 815 cooperating with a ratchet wheel 816 fast on shaft 765 (Figs. 51 and 52) prevents the reset key 813 from being turned backwardly after the reset operation is started. A pin 818 on the key, operating in a groove 819 formed in the key opening of the side wall, prevents removal of the key 813 until the shaft 765 is in the zero position, and all the consecutive number wheels are at zero.

Since, in resetting the consecutive numbering wheels to zero, the operator cannot see when the wheels are in the zero positions, and the key has completed a rotation, a special locking means (Fig. 53) is provided, which arrests the key after one complete rotation thereof. This locking device comprises a pawl 820, mounted on a stud 821 of the side wall 6, and it is urged clockwise toward a stationary pin 823 by a spring 822. The pawl 820 lies in the plane of pin 818 and is so shaped that when in normal position, it permits inserting and turning the key 813 in clockwise direction. Near the end of the key rotation, pin 818 rocks pawl 820 counter-clockwise until the lower end of slot 824 engages the stationary pin 823 (as shown in Fig. 53), and arrests the pawl 820 and, thereby, the key 813. After the key is removed from the machine, the pawl 820 is returned to normal position by the spring 822. Thus resetting the consecutive number is completed.

Mounted on shaft 826 is a frame 827 (Fig. 46A), fastened to the printer walls 5 and 6, which supports an electroplate 828 to print

therefrom fixed data, for instance, the firm name or name of the proprietor.

CONSECUTIVE NUMBER PRINTING THROW-OFF MEANS

The consecutive numbering mechanism can be modified by the following mechanism if it is desired to disable the consecutive number printing when entering items of multiple-item transactions. Compare Figs. 64 and 73.

There are provided two printing hammers 832 and 1301 (Figs. 71 and 72). The printing platen of hammer 832 extends over the type wheels 743c to 747c of the appropriate type wheel set, and printing hammer 1301 cooperates with the consecutive number type wheels 742c. The hammers 832 and 1301 are pivoted on shaft 833. By means of a stud 1302, eccentrically attached to one end of a shaft 1303, carried by the arms of the printing hammer 832, the hammer 1301 is connected to hammer 832 to operate together. Fast on the other end of shaft 1303 is an arm 1304 which, by a stud 1305 and a link 1306, is connected to a lever 1307 fast on shaft 1308. The shaft 1308 has secured to it a lever 1309 having an elongated hole engaged by a pin 1310 attached to the link 798. By means of the angular lever 799, this link is connected to shaft 92 which is moved only in registering single amounts and item totals.

When the parts are in home position as per Fig. 71, the printing platen of hammer 1301 is somewhat lower than that of hammer 832. If, in recording an item of a multiple-item transaction, or in taking a subtotal or total from one of the special totalizers, hammer 832 is actuated in a manner later described, without the shaft 92 having been moved previously, hammer 1301 is carried along. However, as its printing platen is lower, it does not cause the consecutive number to be printed on the audit strip.

As heretofore mentioned, in registering a single amount and in item totalizing, shaft 92 is rocked clockwise due to which the link 798 is moved down and, by the parts 1310 to 1304, the shaft 1303 is rocked counter-clockwise about 90 degrees. The eccentric stud 1302 moves at that time the printing hammer 1301 until its printing platen is level with that of the hammer 832. If the latter is actuated, hammer 1301 takes an impression from the consecutive number printing wheels.

"TOTAL" TYPE WHEEL SETTING

The commodity type wheel 744a (Fig. 50), of the check printer is connected to a type segment 739 which, under the action of a spring 736, engages a stop 737 of type wheel 744a, so that in their zero positions the type characters of the two carriers, together, form the word "Total." The manner of holding the differential device of the commodity key bank in zero position in connection with taking multiple item totals and totals from the classification totalizers was set forth above. Since the setting of the type wheel 744a is effected by this differential device, it is clear that in such machine operations the word "Total" is printed on the check. When the commodity type wheel 744a is adjusted out of its zero or home position, the type segment 739 is carried along by stud 737 and is thus moved out of normal position. Since, in the check printer, the type segment 739 is located in the place of the two amount type wheels of highest denominational orders, said segment, when rotated, would interfere with the ring gears 715 allotted to

those amount wheels and obstruct the setting of same. To avoid this, a stationary stop 738 is provided having an extension 738a extending into the path of the type segment 739, which arrests the segment before it enters into the path of the respective ring gears 715, while, with the spring 736 being tensioned, the commodity type wheel 744a continues to be rotated until the desired character is set into printing position.

TYPE WHEEL ALINER

The lower type wheel shaft 733 carries an aliner ball 801 (Figs. 46A, 56, and 111) connected to a two-armed lever 802—803. The arm 802 has attached thereto a spring 806 urging a roller 804 on the arm 803 towards the circumference of a cam disc 805. This cam disc 805 rotates counter-clockwise in each machine operation, and is so shaped that the spring 806, after the type wheels are set, urges the aliner ball 801 into engagement with the proper alining teeth of the rings 715 and thus alines and locks all type wheels and their setting members for the printing operation, and thereafter releases them near the end of the machine operation.

After the type wheels are set and locked in the manner described, printing therefrom, upon the record material inserted in between the type and the printing hammers, is effected, when the latter are urged toward the type wheels.

AUDIT STRIP PRINTING

In each machine operation, the audit strip 831 (Fig. 46A) has printed thereon, the data standing on the type wheels 742c—747c. The audit strip printing hammer 832 (Figs. 46A, 47, and 112) is carried by a stationary shaft 833, and is actuated in a manner about to be described. An eccentric bore in a tube 834, inserted into the printing hammer head, is engaged by a pin 835 of a link 836 which is connected to a link 838, by a stud 837, carried by a stationary stud 839. The stud 837 engages a hole of a roller carrying lever 840 carried by the stationary stud 845. Two rollers 841 and 842, carried by the lever 840, cooperate with a pair of cam discs 843 and 844, so that the lever 840 is rocked first clockwise and then returned. The cam discs 843 and 844 belong to a disc packet mounted on stud 846 which is rotated clockwise by the main drive shaft 50 over the gear wheels 785, 784, 783, 847 and 848 (Figs. 54 and 55).

As a consequence, the stud 837 is moved to the left (Fig. 112), and as stud 839 is fast on the side wall 5, the toggle-lever consisting of the two levers 836 and 838 is straightened. Due to this, the printing hammer head 832 is raised so far that it can urge the audit strip 831 and the ink ribbon toward the type wheels and thus cause a print on the audit strip, the audit strip and the ink ribbon lying in between the printing hammer and the appropriate type wheels.

AUDIT STRIP FEED MECHANISM

The audit strip supply and storing spools 853 and 854, respectively, are carried by studs 855 and 856 respectively, of a drum 858 (Figs. 46A and 46B) which is rigidly connected to a gear wheel 870 (Figs. 113 and 114) fast on shaft 860.

The audit strip runs from the supply spool 853 over the guide rollers 861, 862, 863, and 864 to the storing spool 854. The guide rollers 862 and 863 are stationary, whereas the two rollers 861 and 864 are carried by the drum 858, which, in each machine operation, by means of an in-

termittent gearing 870—878 (Figs. 46, 54 and 55), is rotated slightly in a clockwise direction, then counter-clockwise through a certain angle before printing, and, after printing, is rocked clockwise back to its home position. Rotation of drum 858 causes the audit strip to shift, so that its last printed line is moved back from the point visible through window 865 to the printing point, and thereafter moved back again.

For the purpose of line spacing the printed entries, the audit strip is fed in addition to being shifted by the suitable rotation of the storing spool 854 (Fig. 108). To this end, the storing spool 854 has a friction clutch comprising the parts 881, 882, 883. Part 881 has connected thereto a link 884 which by a link 885 (Fig. 46A) is connected to a feeler 886 attached to the drum 858. Under the tension of a spring, roller 886a of the feeler 886 rests on the circumference of the storing spool 854, so that when the spool diameter is growing, it is rocked to the left and carries along the link 884 (Fig. 108), the pin 887 of said link being moved thereby within a slot of an angular lever 888 pivoted at 855. The other arm of the angular lever 888 has a roller 889 engaging the face of a cam piece 890 fast on the side wall 5. When drum 858 rotates, roller 889 rides along the face of the piece 890, and at that time the angular lever 888 is rocked counter-clockwise due to the shape of the face 890, whereby over the link 884 and the friction coupling 881—883 the storing spool 854 is turned in order to feed the audit strip by a line space. Due to the link 884 being connected to the feeler 886, the ratio of one arm of the angular lever 888 is altered, relative to the growing diameter of the storing spool so that the audit strip is fed always by one and the same line space. When the drum 858 is turned back, the angular lever 888 and the link 884 return to their initial positions under action of spring 8881, one end of which is connected to stud 8882 on lever 888, and the other end of which is connected to stud 8883 on the disc 8884 on stud 856. The link 884, however, moves idly, as the friction coupling 881—883 is not effective in this direction.

A key 1889 (Figs. 1 and 54) is provided for manually spacing the audit strip when desired. The key 1889 is secured to a shaft 1890, to which is also secured an arm 1891 contacting the roller 889. Depressing key 1889, against the action of a spring 1892, rotates lever 888 counter-clockwise, which, through link 884 and friction coupling 881—883, rotates the storing spool 854 to feed the audit strip.

INK RIBBON FEEDING AND REVERSING DEVICE

The ends of the ink ribbon 891 (Fig. 46A), which by means of guide rollers 892 is guided past by all printing points, are fastened to spools 893 and 894, and can be fed, in a manner about to be described, in either direction by the step-wise rotation of one of the spools. After one spool is emptied, the feeding device is automatically reversed.

Feeding the ink ribbon is performed by gear wheel 879 fast on the main drive shaft 50, which drives two gear wheels 880 and 880a, and a cam disc 895. The cam disc 895 actuates a slide 896, so that the latter rocks a lever 897, bifurcated at its free end to engage a pin of a pawl carrier 899, and thereby rocks the pawl carrier in clockwise direction, and back again. A stud 898 of the pawl carrier carries a trip pawl 901 having a star wheel 903 on pivot 902. Said star

wheel comprises two isosceles triangles lying in different planes, alternately arranged and rigidly connected to each other. By means of a spring loaded pawl 904 extending over both planes, the star wheel 903 and the pawl 901 are kept in position, so that the star wheel can be rotated only when the rotating force increases relatively considerably. In the plane of the front triangle, there lies a gear wheel 905 connected to the spool 893 to rotate together and carried along in clockwise direction by the star wheel 903 when the latter is moved upward. While spool 893 is rotating, the ink ribbon is rewound on it to a determined extent, and wound off the spool 894 the same extent. Thus spool 894 and the gear wheel 906 connected to it are rotated in clockwise direction. The gear 906 meshes with another gear wheel 907, loosely mounted on stud 908, and not connected to spool 893. Wheel 907 rotates idly without contacting the other triangle of the star wheel 903 lying in its plane. When the pawl carrier 899 moves upward, pawl 901 turns the wheel 910, loosely mounted on stud 908, in clockwise direction by one unit until it is held in its new position by a spring loaded pawl 909. When the pawl carrier 899 is restored, this pawl prevents the wheel 910 from being carried along, so that pawl 901 rocks somewhat in counter-clockwise direction, which disengages the star wheel 903 from the gear wheel 905. Thus the feeding parts when returned do not affect ink ribbon feeding.

To control the reversing of the direction of feed of the ink ribbon, two spring loaded feelers 911 are provided, which engage the circumference of both spool discs. The spool discs consist of two portions, viz.: the spool flange 913 and a disc 914 rotatable about pin 915 of the spool flange and, normally, covering the recess 916 in the edge of the spool flange, so that this flange is completed to an annular disc.

Even if only one winding of the ink ribbon is on one spool, it holds the disc 914 having a recess to keep therein the core of the spool, in the position shown in Fig. 46, in that the edge of the ribbon surrounds a lateral bent over portion 917 of the disc 914, urging it toward a corresponding flattening of the spool core. With the discs 914 positioned thus, the allotted feelers 911 rest on the edge of the spool flange 913 and the discs 914, so that the feelers remain raised. However, if the ink ribbon has entirely left the spool, the lateral bent over portion 917 of the disc 914 is no longer held in position by the ink ribbon, so that under the tension of the spring loaded feeler 911, the disc 914 is urged inward about the stud 915. Thus the respective feeler is caused to move downward, and a locking hook 912, connected to said feeler, is moved into a gap between the teeth of the gear wheel 905 and 907, respectively, due to which this wheel is prevented from continuing clockwise rotation.

If, in the next machine operation, the pawl carrier 899 is moved upward, the star wheel 903 cannot rotate the locked wheel 905 or 907. Due to this obstruction, the star wheel 903, when the pawl carrier 899 moves upward, is rotated by one unit. At this time the pawl 904 ratchets over the star wheel in such a manner as to lock the star wheel again after a one-sixth of a rotation. Thereby the back triangle is moved into effective position relative to gear wheel 907 and, during the continued actuating motion of the pawl carrier 899, the star wheel rotates gear wheel 907 in clockwise direction, and, consequent-

ly, the two ink ribbon spools in counter-clockwise direction, so that, now, the rotations of the spools 894 and 893 are reversed.

CHECK PRINTING MECHANISM

(a) Check strip slackening device

The checks issued by the machine are severed from a check roll 921 (Fig. 46A) rotatable upon a stationary stud 920. By means of a movable guide roller 923 and a chute 924, the check strip is passed by the check printing point and between two feeding rollers 925 and 926, and led to the cutting device 927—928. The movable guide roller 923 is carried by a rock lever 931 linked to a two-armed lever 932. A spring 933, attached to the rock lever 931, keeps the upper arm of lever 932 in contact with a cam disc 934, connected to the gear wheel 880a, which is rotated clockwise in each machine operation. The cam disc 934 is so shaped, that, during the first half of the machine operation, it rocks the lever 931 gradually in clockwise direction, and then allows the lever to return suddenly under the tension of spring 933. During the time of initial movement of the lever 931, the feed rollers 925—926 hold the free end of the strip tightly gripped between them and therefore a certain length of the check strip is wound off of the supply roll 921. The rock lever 931 being returned, a portion of the check strip is slackening, and thereafter a check length is advanced from this slackened portion by the feed rollers 925 and 926 without rotating the entire check paper supply roll.

(b) Oscillatory printing hammers

For check printing, the two type wheel sets 739, 743a to 746a (Fig. 50) and 741a and 742a (Fig. 51) mounted on shafts 731 and 748, and an electroblock 828 (Fig. 46A) are provided, as well as three oscillatory printing hammers 936, 937 and 938 (Figs. 46A, 117, and 122) arranged opposite said elements. The three hammers are similarly constructed and consist mainly of a frame carrying a loosely mounted friction roller 940. Three springs 939 (Fig. 57) tend to keep the roller in its lowermost position. Each hammer is pivoted on a shaft 941 having two eccentrically arranged journals supported in the side walls 5 and 7. One journal of each of the three shafts has a gear wheel 942 (Fig. 116) fast thereon and all three gear wheels 942 mesh with a rack 943 horizontally shiftable on guide pins of side wall 5 (Fig. 54). The front end of the rack has pivoted thereto an arm 944 carried by the stationary stud 945, and the arm 944 is connected to a lever 946 having pivoted to it an arm 947. The arm 947 is pivoted on stud 845 and is rigidly connected to a lever 948 having rollers cooperating with cam discs 949 and 950, mounted on shaft 846 and connected to gear wheel 848 which is, as set forth above, rotated clockwise (Fig. 54) in each machine operation. By means of the cam discs 949 and 950 and the linkage connected to the rack 943, the rack is moved first to the left which causes the three eccentrically mounted shafts 941 to be rocked, and the three hammers lowered. In the second half of the machine operation these motions are reversed.

The hammer 936 (Fig. 117) has connected thereto one end of a link 952. The other end of the link is connected to an arm 953 of a lever 954 on shaft 955. The two rollers of lever 954 cooperate with cam discs 956 and 957, fast on

shaft 960. When shaft 960 is driven, the cam discs 956 and 957, and the link 952 cause the hammer 936 to oscillate about its shaft 941. As above mentioned, the hammer is lowered before it rocks to the right, so that the friction roller 940 urges the check strip towards the type characters, said roller rolling across it, and thereby taking an impression on the check strip. After the impression has been taken, the cam discs 949 and 950 again raise the printing hammer by rocking the shaft 941 back to its original position, so that the platen roll is in disabled position when the hammer swings back to its original position under action of cam discs 956 and 957.

(c) Drive for the amount printing hammers

The printing hammer 936 (Fig. 117) for printing the amounts on the checks is actuated in single-item and multiple-item transaction entering operations, and in multiple-item total taking operations whenever the machine is conditioned for check printing. This hammer, however, should not be operated in total taking operations other than multiple-item total taking operations. For this reason, the two cam discs 956 and 957 are not actuated for such total taking operations, and therefore, the actuating device for the hammer 936 is constructed as follows:

Shaft 960 (Figs. 54, 58 and 118) carries a gear wheel 961, having a mutilated portion engaging the locking surface of a gear wheel 962 having teeth only on one half of the circumference. Thus the gear wheel 961 is normally secured against rotation. The gear wheel 962 is rigidly connected to a wheel 964 and secured to shaft 965. Through an intermediate wheel 966, the wheel 964 is constantly connected with gear wheel 880a which performs a counter-clockwise rotation (Fig. 54) during each machine operation. Consequently, the wheel 962 is rotated counter-clockwise (Fig. 118) during each operation of the machine. Wheel 962 has attached thereto an initiating tooth 963 lying in the plane of a coupling disc 967, connected by a spring to gear wheel 961, but the initiating tooth 963 passes ineffectively by said coupling disc, if the single tooth of the coupling disc is not in the path of the initiating tooth 963. Pin 968 of the disc 967 is engaged from each side by levers 969 and 971 respectively. A spring 972 stretched between these two levers tends to maintain this scissor-like engagement of pin 968. Both levers are loosely mounted on shaft 970, and a spring 973 attached to lever 971 tries to rock the levers 969 and 971 in counter-clockwise direction (Fig. 118). Normally, this is prevented by a pin 975 (Figs. 54 and 119), which pin is carried by a two-armed lever 974 rigidly connected to lever 971, and which pin normally rests on the unmutilated portion of the control disc 976.

In the same manner as described above for adjusting the gear wheels 702 (Figs. 48 and 50), the control disc 976 is adjusted in accordance with the control keys depressed, by means of the differential device of the control key bank. The control disc also serves as a means for adjusting the proper type wheels 747a—c. When in the control key bank (Fig. 33) the multiple-item check key 21 is depressed, the main differential member 32e moves upwardly until it strikes the stem of the key depressed. This adjusts the control disc 976 (Fig. 54) so that its recess 977 is moved beneath pin 975. If in the control key

bank, or the transaction key bank, no key is depressed and no slip inserted, the main differential member moves upward by eight units until its extension 602 strikes pin 603 of arm 604 which, normally, is positioned as shown in Fig. 33 and is displaced only by circumstances detailed later. When the main differential member 32e is moved through eight units, the control disc 976 is so adjusted that the recess 978 (Fig. 119) is underneath the pin 975. When the machine issues itemized checks, and checks covering a single-item "Cash" transaction, without a slip being inserted, the control disc 976 with its two recesses 977 and 978 causes the check printer shaft 960 of the check printer drive to be coupled with the drive shaft 965.

In all other machine operations, pin 975 is held in its upper position by the unutilized circumferential portion of the control disc 976, which causes the coupling disc 967 to be held, so that its single tooth is outside the path of the initiating tooth 963. At this time, owing to the wheel 961 and the coupling wheel 967 being coupled by a spring, a pin 979 of gear wheel 961 engages a stop surface of the coupling disc 967, thus preventing the gear wheel 961 from meshing with the teeth of wheel 962 when the same rotates counter-clockwise (Fig. 54). Consequently, the shaft 960 cannot be driven in this case. Shaft 950 carries a spring loaded pawl 958 which lies in the notch of a disc 959 fast on shaft 960 thus securing the shaft 960 against unintended rotation.

However, when the control disc 976 is so adjusted that pin 975 can drop into one of its notches 977 or 978, the spring 973 rocks the levers 974, 971 and 969, and the coupling disc 967 in counter-clockwise and clockwise directions respectively (Fig. 54), by which the tooth of the disc comes into the path of the initiating tooth 963. After a half rotation of wheel 962, the initiating tooth 963 strikes the tooth of the coupling disc 967 and causes thereby the meshing of the teeth of the two wheels 961 and 962. During the second half of its rotation, wheel 962 rotates the wheel 961 and, in connection therewith, the shaft 960 clockwise (Fig. 117). At this time, pin 979 (Fig. 118) carries the disc 967 along. Pin 968 of said disc first urges the lever 969 aside and, near the end of its revolution, also lever 971 by striking its inclined surface. Having regained initial position, said pin lies again between the two levers 969 and 971. Therefore, while shaft 960 rotates, the cam discs 956 and 957 (Fig. 118) operate the printing hammer 936, only when single-item transactions are registered without the insertion of a slip, and when multiple-item transactions are entered with the multiple item check key 21 depressed.

(d) Short check feeding

The shaft 960 (Fig. 120) has fast thereon a gear wheel 981, which, through an intermediate wheel 982 and two gear wheels 983 and 984 fast on shaft 985, rotates the wheel 986 mounted on shaft 980 counter-clockwise. Connected to gear wheel 986 is an arm 987 having a tooth which, when the arm is rotated, rotates a gear wheel 988 lying in its plane. The gear 988 meshes with a gear 989 connected to a bevel pinion 990 to rotate therewith. The bevel pinion 990 meshes with a bevel pinion 991 pinned to a shaft carried by the machine framework. Also pinned to said shaft is a gear 992, meshing with a pinion 993 connected by a shaft to a bevel pinion 995, 75

which in turn meshes with a bevel pinion 994, connected for rotation to the upper check feed roller 925, which thereby is rotated in clockwise direction through a predetermined angle. Thus the check strip is fed to the right by one line space.

(e) Long check feeding

The gear wheel 988 (Fig. 121), is wide enough to reach into the plane of a gear segment 996 (see also Fig. 58) fast on a shaft 980. This segment has a plurality of teeth, the first tooth of which is aligned with the single tooth of arm 987. The segment 996 also has a single tooth 997 which, when the segment 996 is rotated clockwise at the beginning of the machine operation, rotates the wheel 988 and the check feed roller 925 a short extent to line space the check strip in the same manner as does tooth of arm 987. Some time after the data has been printed upon the check, the plurality of teeth of the segment 996 is operated, by means later described, and thereby rotates the check feed roller 925 far enough to feed the check out of the machine.

(f) Date and electro printing hammer

Fastened to the shaft 980 are cam discs 1001 and 1002 (Figs. 58 and 122) which, while the shaft 980 rotates, rock a roller carrying lever 1003 pivoted on shaft 1005 in clockwise direction and back. An arm 1004 of said lever has connected thereto a link 1006 which by means of pins 1007 and 1008 is connected to the two rockable printing hammers 937 and 938. Thus, these two hammers are moved to and fro each time the shaft 980 is rotated, and since, due to the rotation of their eccentric shafts 941, the two hammers are lowered and raised in the manner described, they cause, while rocking to the right, the date, the consecutive number and the data on the electroplate on the block 928, to be printed during their back motion. When the eccentric shaft 941 is raised, the hammers move back idly.

(g) Check cutting device

Cam discs 1011 and 1012 (Fig. 126) fast on shaft 980 rock a roller carrying lever 1013 pivoted on shaft 1010. The said lever is connected by arm 1014 and link 1015 to a gear segment 1016. Segment 1016 meshes with a toothed segment 1017 attached to a round knife 928. This knife is rotatably supported in the side walls and has an opening for the check strip to pass through it. When the shaft 980 is rotated, the round knife 928, by the described actuating device, is turned in counter-clockwise direction and back. The cutting edge of the round knife cooperates with a flat knife 927, so that the check strip passed through the round knife, is cut off when the round knife rotates counter-clockwise, which can thereafter be taken from the chute 1020 (Figs. 1 and 46B) by the operator.

(h) Control of printer drive shaft 980

The hammers 937 and 938, the mechanism for feeding the check strip its greater extent, and the check cutting device are not to be actuated unless in connection with machine operations in which the machine is conditioned for check printing, and then only when single-item transactions, and multiple item totals, are to be recorded. For this reason, the drive shaft 980 for the above mentioned devices, is caused to operate in unison with the shaft 960, under control of a slip feeler, and the shaft 92.

Fast on shaft 980 is a gear wheel 1021 (Figs. 46A, 58, and 131) meshing with wheel 1022 loosely mounted on shaft 960. Wheel 1022 is rigidly connected to a gear wheel 1023 having two teeth omitted. This gap is engaged by the locking surface of a wheel 1024 fast on shaft 965 which is driven during each machine operation. Thereby gear wheel 1023 is secured against rotation, and even when the teeth of the rotating wheel 1024 approach wheel 1023, the latter cannot mesh with these teeth, as wheel 1023 is held in its home position and secured against rotation, by a notched disc 1025 cooperating with a spring loaded retaining pawl 1026. A pair of levers 1033 and 1034, coacting with stud 1031, maintains a coupling disc 1028 in contact with a pin 1027 of wheel 1023, one tooth of said disc being outside the path of an initiating tooth 1029 attached to wheel 1024. Pin 1031 of coupling disc 1028 is engaged in scissorlike manner by the two levers 1033 and 1034 loosely mounted on shaft 970 and kept together by a spring 1032. The angular lever 1034 has attached thereto a spring 1040 tending to rotate the angular lever 1034 in clockwise direction. This, however, is normally prevented by the other arm of the angular lever 1034 being connected to an arm 1037 of a bail 1036 mounted on shaft 1035 and urged by a spring 1041 towards a pin 1042 of arm 1043 on shaft 1035. Shaft 1035 also carries an arm 1044 connected by a rod 1045 to the angular lever 799 fast on shaft 92. The bail 1036 has arm 1038 engaged by the pin 1039 of the above-mentioned two-armed lever 974, which has the pin 975 cooperating with the control disc 976. As before-mentioned, this two-armed lever 974 is rotated in a clockwise direction (Fig. 131), only when the machine is conditioned for check printing. In all other machine operations, pin 1039 prevents the bail 1036 from turning in clockwise direction (Fig. 131) under the action of spring 1041. Further, this rotation is normally obstructed by the pin 1042 unless the shaft 92 is rotated. Only after the machine, and the control disc 976 are conditioned for check printing, and the shaft 92, and the arm 1043 respectively, have been moved, springs 1041 and 1040 acting in the same direction, are able to move bail 1036 in counter-clockwise direction, (Fig. 46A) or clockwise as shown in (Fig. 131), and the levers 1033 and 1034 in clockwise direction (Fig. 131), and counter-clockwise (Fig. 54). The coupling disc 1028 is thereby turned in counter-clockwise direction (Fig. 131), until its tooth comes into the path of the initiating tooth 1029.

When, now, wheel 1024 rotates, the initiating tooth 1029 strikes a tooth of the coupling disc 1028 and causes wheel 1023 to mesh with the teeth of the wheel 1024 and be rotated counter-clockwise (Fig. 131) by the latter. Through the gear wheels 1022 and 1021, this rotation is transmitted in reversed direction to shaft 980, which now operates in unison with the shaft 960 and actuates the abovementioned date and electro-printing, long check feeding and check cutting mechanisms. Thus it is evident, that in each check printing machine operation described later, the amount printing hammer 936 and the device for line spacing the check strip are actuated, and that in all check printing machine operations, which (by rotating shaft 92) are conditioned for recording single-item transactions, or totals of multiple-item transactions, in addition to the amount printing hammer, the line spacing device, the two date and electro printing hammers

937 and 938, the long check feed, and the check cutting devices are actuated.

SLIP PRINTER

(a) Printing hammer

The front printing position is provided for printing slips inserted into the chute 1051 (Figs. 1 and 46B). A hammer 1052 cooperates with the type wheels mounted on shaft 732, which are provided for that purpose. This hammer is shiftably guided on a shaft 1053 supported in the side walls 5 and 6; and is carried by a shaft 1056 supported by two arms 1054 (Figs. 46B and 60) pivoted on the stationary shaft 1055. These two arms are connected to the shaft 1056 extending through the body of the printing hammer. Each laterally extending trunnion of shaft 1056 carries a link 1057. A cross bar 1058 connects the two links to two levers 1059 pinned to shaft 1053. At the left-hand end, the shaft 1053 has a lever 1060 secured thereto. The latter is rigidly connected to a lever 1061 pivoted in a bearing in wall 5 and has a hole engaged by the pin 1062 of a roller carrying lever 1063 pivoted on a stationary stud 1065. Rollers 1066 and 1067 of the lever cooperate with cam discs 1068 and 1069 carried by a stationary stud 1070, so that by the cam discs rotating in clockwise direction (Fig. 46B), by mechanism later described, the lever 1063 is rocked twice in clockwise direction and back again. Due to this motion, the toggle levers 1059, 1057 are actuated twice, whereby the hammer 1052 is moved to the left, so that it causes the data set on the type carriers to be printed twice upon the inserted slip.

(b) Slip feeding device

After the first impression, the slip has to be fed by the mechanism described hereinafter, so that the second impression will be made on the duplicate slip.

The cam discs 1068 and 1069 are connected to cam discs 651 and 652 (Figs. 60, 62, and 124) to rotate together. Discs 651 and 652 actuate a roller carrying lever 653 pivoted at 1065. The upper end of said lever has gear teeth 654 in mesh with a gear wheel 656 secured to the shaft 655. Through a gear 658, shaft 659, and segment 660 (Fig. 125), a gear wheel 657 fast on the shaft 655 is in connection with a gear wheel 661 pivoted on stud 652 in line with shaft 655. Each wheel 657 and 661 is connected to a feed segment 663, each being faced by a feed disc 664, which are rotatable on shaft 732 at each side of the slip printing type wheel set. The cam discs 651 and 652 are so shaped that after the first printing operation of hammer 1052 they rock the lever 653 in a clockwise direction (Fig. 124) which causes the feed segments 663 to rotate counter-clockwise, as viewed in Fig. 124, and clockwise as viewed in Fig. 46B. In cooperation with the friction rollers, they catch the inserted slip and move it up far enough so that the second impression is made on the duplicate or lower portion of the slip.

A slip feeler 1140 (Fig. 54) is provided, which when the machine is operated moves clockwise to contact the slip in the slip chute, in a manner hereinafter described.

The roller carrying lever 653 has a pin 671 (Fig. 123) which, when the said lever is rocked, strikes an arm 672 fast on a shaft 1135 to which the slip feeler is also secured. Thus pin 671 rocks the shaft 1135 and withdraws the slip feeler 1140 from contact with the slip to prevent

the latter, when fed, from being held or damaged by the feeler.

(c) Printing hammer control

Operation of the slip printer depends mainly upon whether a slip is inserted into the chute 1051, or not; and, in addition thereto, upon whether one of the three multiple item keys is depressed, and which kind of machine operation is being performed (single-item, multiple-item transactions, multiple-item totals, or classification totalizer clearing operations). For properly controlling the slip printing hammer 1052, the devices detailed hereinafter, are provided.

The actuating cam discs 1068 and 1069 are connected to a gear wheel 1071 to rotate together (Figs. 61, 62, and 115). Two teeth of wheel 1071 are missing. Normally, this gap is engaged by the locking surface of wheel 1072 rotatable on shaft 846 and clockwise rotated by the main drive shaft 50 (Figs. 54 and 55) through the before described gearing 848, 847, 783, 784 and 785. Normally, this rotation is not transmitted to the gear wheel 1071, as this wheel is connected to a notched disc 1073 co-operating with a spring loaded retaining pawl 1074 in such a way that normally the wheel 1071 is held positioned so that its teeth cannot come in mesh with the teeth of wheel 1072. Wheel 1072 has attached thereto an initiating tooth 1075 lying in the plane of coupling disc 1076 (Figs. 54, 61 and 62) arranged beside the gear wheel 1071. A minor spring, not shown, holds this coupling disc in contact with a pin 1077 of wheel 1071, so that, normally, its single tooth lies outside the path of the initiating tooth 1075. In these circumstances the wheel 1072 turns idly.

(d) Slip feeling device

A lever 1082 (Fig. 115) fast on shaft 1080, contacts pin 1081 of the coupling disc 1076. Under the action of spring 1084 stretched between levers 1082 and 1083, lever 1083 loosely mounted on shaft 1080 engages pin 1081 from the other side, so that this pin is engaged scissors-like from each side.

An angular lever 1085, fast on shaft 1080, has a pin 1085 which, by spring 1087, is urged towards arm 1088 having a rounded extension bearing against the circumference of a control disc 1090. This control disc is provided with internal teeth like the internal teeth of the toothed rings 705 for type wheel setting. The control disc is actuated by the differential device of the control key bank for the purpose of setting the appropriate type wheels 747. The control key bank has a number of stops for controlling the differential setting of the main differential member 32e, which is positioned in a manner described hereinafter, and which thereby determines the adjustment of the control disc 1090. Here it is mentioned that, in slip printing machine operations, notch 1091 or 1092 of the control disc faces the rounded off extension of lever 1088. Thereupon, under the action of spring 1087, the parts 1088, 1086, 1080, 1082 and 1076 tend to rotate, due to which the single tooth of the coupling disc 1076 is urged into the path of the initiating tooth 1075. Then, during machine operation, the gear wheel 1071 and the cam discs 1068 and 1069 would be rotated and thus the slip printer would be actuated.

However, slip printing is not desired each time the control key bank allows of such printing and, 75

for this reason, the operation of the slip printer depends upon the suitable positioning of the parts as follows: Fast on shaft 1080 (Figs. 61, 62 and 74) is another lever 1095 engaged by pin 1096 of lever 1097 loosely mounted on shaft 200. A pin 1098 at the upper end of lever 1097 engages a slot in lever 1099 carried by a stationary stud 1100 and rigidly connected to another lever 1101. A slot of the lever 1101 is engaged by pin 1102 of an angular lever 1103 (Fig. 129) carried by a stationary stud 1105 and connected by a link 1104 to a two-armed lever 1106 loosely mounted on shaft 60 (see also Figs. 39, 61 and 62). Lever 1106 is rigidly connected by stud 1107 and arm 1108 to a cam lever 1109 loosely mounted on shaft 60. The slot of the cam lever 1109 is engaged by a roller 1110 of an angular lever 1111 (Fig. 130) connected by a rod 1112 to a roller carrying lever 1113 mounted on shaft 50. The two rollers 1114 and 1115 of this lever cooperate with cam discs 1116 and 1117 fast on the drive shaft 55 (Figs. 39 and 61). Pin 1118 at the upper end of the angular lever 1111 is embraced by a forked arm 1119 fastened on shaft 250. Spring 1120 attached to the angular lever 1103 tends to rotate the lever 1109 in counter-clockwise direction, roller 1110 then urging the angular lever 1111 towards the circumference of a tube 1121 on shaft 60 and thus holding the parts positioned as shown in Fig. 130.

Pin 1123 of lever 1097 engages a slot of the two-armed lever 1124 (Figs. 61, 62 and 75) pivoted on stud 1125 of the angular lever 410—411 (see also Fig. 15) which, as above mentioned, is counter-clockwisely rocked each time the machine is released by the release bail 400. Another slot of the double-lever 1124 is engaged by pin 1126 of arm 1127 loosely mounted on shaft 200. The lower end of this arm has linked thereto a locking member 1128 suspended on an angular lever 1129 carried by the stationary stud 1130. In the initial position shown in Figs. 61 and 75, the extension 1132 of the locking member 1128 lies in front of a pin 1133 of a locking lever 1134 fast on shaft 1135 and having a flange 1136 extending into the path of another projection 1137 of the locking member 1128. Further, shaft 1135 has secured thereto the feeler 1140, confronting slot 1139 in the two guide plates of the slip guidance. Spring 1141 attached to the slip feeler 1140 tries to move the feeler through the slot 1139. Normally, this is prevented because pin 1133 lies before the extension 1132 of the locking member 1128 and because due to the above mentioned connections, this locking member cannot move to the right.

If no slip is inserted and, upon releasing the machine, the angular lever 410—411, and the stud 1125 are rocked counter-clockwise (Fig. 61), stud 1125 carries along the double lever 1124. The roller 1110 limits the movement of the connections 1097 to 1109, under action of spring 1120, and therefore the parts remain in the positions shown in Fig. 61, and the pin 1123 is also held in the position shown. When stud 1125 is moved to the left, due to the resistance of pin 1123, the double-lever 1124 is rocked clockwise, rocking then lever 1127 in counter-clockwise direction. Thus the locking member 1128 is moved to the right, which is aided by spring 1131. This movement of locking member 1128 releases spring 1141 to rock shaft 1135 together with the locking lever 1134, and the feeler 1140, in clockwise direction. When no slip is inserted, this motion of the

slip feeler 1140 is not arrested until the shaft 1135 is rocked its greatest extent, whereupon the flange 1136 of lever 1134 leaves the path of the extension 1137 of locking member 1128. Thus when no slip is inserted, the stud 1125, when moved upon releasing the machine, does not rock lever 1097 (see also Fig. 74), and the pin 1096 of said lever holds the shaft 1080, the levers 1095 and 1082, and the coupling disc 1076 so positioned (see Fig. 61), that the slip printer cannot be actuated by wheel 1072.

When no slip is in the slip chute, the lever 1113 actuated by cam discs 1116 and 1117, and the angular lever 1111 actuated through the link 1112, move idly. Such result is obtained because the inertia of the parts on shaft 250 and those connected therewith, is sufficient to maintain the pin 1118 of the lever 1119 in the position shown, and therefore when the lever 1111 is operated it rocks around pin 1118, and the roller 1110 moves freely within the lower portion of the curve slot. The purpose of cam discs 1116 and 1117 and the elements actuated thereby is given hereinafter.

If, however, before the start of the machine operation, a slip is inserted and, upon releasing the machine, the stud 1125 is moved to the left, even then the pin 1123 tries to maintain its position, so that the locking member 1128 is moved to the right. Pin 1133 participates in this motion because the spring 1141 rotates the shaft 1135 and the levers 1134 and 1140 in clockwise direction. However when the slip feeler 1140 strikes the inserted slip, this motion is stopped, that is, before the bent over portion 1136 of the locking lever 1134 has left the path of the extension 1137 of the locking member 1128. As a consequence, the locking member 1128 is arrested and cannot continue to move to the right, and, thus, the lever 1127, carrying pin 1126, is also arrested. While stud 1125 continues moving to the left, the double lever 1124 rocks about the arrested pin 1126 in counter-clockwise direction and thus rocks lever 1097 in counter-clockwise direction about shaft 200. If, now, the control disc 1090 is adjusted as will be described later, so that one of its notches 1091 or 1092 faces the rounded off extension of arm 1088, the spring 1087 is able to rock shaft 1080 and the levers 1085, 1095, 1082 in clockwise direction, so that the coupling disc 1076 is counter-clockwise rotated. Consequently, the single tooth of this coupling disc comes into the path of the initiating tooth 1075, so that now the actuating wheel 1072 is enabled to actuate the slip printer.

If the inserted slip is removed after the motor bar is depressed, but before the slip is printed, the slip feeler 1140 would be free at this time to move its greatest extent to try to disable the slip printer. However, due to the slip being inserted originally, the slip printer hammer operating mechanism is coupled to be driven by disc 1072. In order to prevent the feeler from so doing, and injuring thereby the slip printer, when the machine continues operating, the shaft 1135 carries a locking arm 1144 to cooperate with a locking surface 1145 of the lever 1099 as will now be described.

When the machine is released, and no slip has been inserted into the slip chute, the locking arm 1144, together with the slip feeler, can travel to full extent without encountering the locking surface 1145. If a slip is inserted into the slip chute, then when the slip feeler is arrested by the slip, the arm 1144 is held so positioned that the locking surface 1145 of the rocked lever 1099 comes

to lie before the locking arm 1144. If the slip would be removed afterwards, the slip feeler is not allowed to drop in, for the locking arm 1144 strikes the locking surface 1145 and prevents the shaft 1135 from continuing rotation.

From the above it becomes quite evident, that with no slip inserted, lever 1097 is not rocked, and, hence, the slip printer will not be coupled with the machine drive, while, when a slip is inserted, the lever 1097 is rocked and the slip printer is coupled with the machine drive, when the control disc 1090 is in certain positions. This control disc is adjusted under control of the control key bank.

CONTROL KEY BANK

No totalizers are allotted to the control key bank differential device. The chief function of this device is to control the printing device in connection with the different registering and total taking operations. The manner of how the main differential member 32e is held in the different positions (Figs. 33 and 34) will now be set forth.

(a) Single-item transaction check

The control key bank has no zero stop pawl. Thus, in each machine operation the main differential member 32e is moved out of the zero position. If, in connection therewith, no key is depressed, the lock 26 is not turned out of its adding position, and no receipt slip is inserted, which is customary in connection with single-item transactions and check issuing, the extension 601 (Figs. 33 and 79) of the main differential member 32e does not encounter any stop. However, after the main differential member has been moved eight steps, its extension 602 strikes pin 603 lying within its path. Thus said pin arrests the differential device in this position. The pin 603 is carried by arm 604 loosely mounted on shaft 48 and rigidly connected to an arm 605. A pin 606 of arm 605 engages a slot of a lever 607 pivoted on a stationary stud 610. A slot of the lever 607 is engaged by a pin 608 of an angular lever 609 linked at 611 to a lever 612 also pivoted on stud 610, and connected to the pin of the "check off" key 25 by link 613. Unless key 25 is depressed, the stud 611 occupies the position shown and serves as a pivot for the angular lever 609. A spring 614 attached to lever 607 keeps the said linkage in the position shown in Fig. 33. The lever 607 is normally pulled upwardly until the pin 608 lies in the right-hand end of the slot therein. Pin 603 of arm 604 then lies within the path of the extension 602 of the main differential member 32e and arrests said member after being moved upward by eight steps.

This movement of the main differential member 32e is transmitted to the control discs 976 (Figs. 119 and 131) and 1090 (Figs. 54 and 61) by means of the differential device 32e—39e and through the appropriate tube 701 (Fig. 50). This adjusts the control disc 976 so that the notch 978 of it underlies pin 975 of lever 974, thus allowing a motion of lever 974 in counter-clockwise direction (Fig. 54). As no multiple item key 21—23 is depressed and lock 26 not turned, the machine is conditioned for single-item transaction recording. In such machine operations, shafts 92 and 1035 are rotated so that the lever 974 is allowed to rock counter-clockwise. After lever 974 is freed, it is rocked counter-clockwise and couples thereby the check printer with the actuating wheels 962 (Fig. 118) and 1024 (Fig. 131).

In such machine operations the control key bank controlling type wheel 747c causes a vertical dash (|) to be printed beside the other data on the audit strip to indicate that a single-item transaction check was issued.

During this operation, the control disc 1090 (Figs. 61 and 115) is adjusted so that no notch faces the rounded extension of lever 1088. This lever prevents lever 1082 from being rocked, so that the slip printer will not be coupled with its drive.

(b) *Automatic check issue*

When any of the control keys, and the "Check off" key 25 (Fig. 33), are depressed, lever 612 is rocked about the stud 610. The joint stud 611 of lever 612 carries the angular lever 609, which has a pin 608 sliding in the slot of lever 607 to the left. Now spring 614 is able to rock lever 607 in counter-clockwise direction about stud 610 until pin 608 again engages the right-hand end of the slot. The angular lever 609 is rocked counter-clockwise about the joint stud 611. Owing to this motion, the arms 604 and 605 are rocked clockwise far enough to allow pin 603 to leave the path of the extension 602 of the main differential member 32e, while the left-hand arm of the angular lever 609 moves into the path of a pin 615 of the key detent 206 of the transaction key bank (Fig. 4). Upon depressing keys 16 (Charge) or 17 (Paid out) said pin is moved upward. Since, upon depressing key 25, pin 603 is moved out of the path of the main differential member 32e, the same is free to move up through nine units, until its extension 602 meets the shaft 48. In this position, the differential member 32e causes the check printer to remain disengaged, for the control disc 976 is thereby so adjusted that no notch of it faces pin 975 of lever 974. As a consequence, lever 974 cannot be rocked even if released by the shafts 92 and 1035 respectively. Due to this the check printer cannot be coupled with either of the wheels 962 or 1024, that is, if the "Check off" key 25 is depressed, normally the check printer and the slip printer, too, are disabled, for the control disc 1090 is so positioned that an unmutated portion of the circumference holds lever 1088 in disengaged position. At this time, the character "O" is printed from the type wheel 747c upon the audit strip beside the other data, to indicate that neither a check nor a slip was printed in connection with this registration.

In recording a "Charge" or "Paid out" transaction, a check serving the sales person as a voucher for the charge sale or the amount paid out is to be issued in spite of the fact that the "Check off" key is depressed. Upon depressing a key 16 or 17, slide 206 is moved up (Fig. 4). Its pin 615 strikes the left-hand arm of the angular lever 609, the lever at this time being in its path (Fig. 33), and rocks it in clockwise direction about its joint 611. At this time, pin 608 carries lever 607 which, in its turn, rocks arms 605 and 604 counter-clockwise, and thus moves stop pin 603 again into the path of the main differential member 32e. As above mentioned, the main differential member, after a travel through eight units, is arrested by pin 603. Thereby the printer is conditioned for check printing in spite of the fact that the "Check off" key is depressed, and, therefore, a print is effected on the check strip and the check strip is fed in the same manner as in single-item transaction check printing.

(c) *Subtotal taking and totalizer clearing*

To take a subtotal, or a total, from a totalizer, the lock 26 is turned to "X" or "Z" and as a result the slide 267 moved up or down (Fig. 21). A curved slot 618 of this slide is engaged by the key pins of the two blind keys 24 and 27 and this slot is so shaped that by the slide moved up, or down respectively, one of the blind keys 24 or 27 is moved inward. With the blind key 27 operated, the main differential member 32e is arrested, after having moved a step upwardly. If the blind key 24 is operated, said member is arrested after a movement of three steps. If the main differential member is in one of these positions, the check and slip printers are disabled, for, in these cases, no notch of the control discs 976 or 1090 is opposite the levers 974 or 1088 respectively, and thus the check and slip printers are prevented from being coupled with the machine drive. The subtotals and totals print on the audit strip and are identified by the letters "X" or "Z".

When taking a total from one of the classification totalizers, it is desired to prevent printing the total on an inserted slip. A mechanism is provided to prevent such a print on an improperly inserted slip when taking a total. In such total taking operations the main differential member 32e is arrested by the depressed blind key 27 or 24 before reaching a stop pin 624a (Fig. 33), adjusted in a manner to be hereinafter described.

(d) *Multiple-item check*

To record a multiple-item transaction and to issue a multiple-item check, key 21 is depressed which arrests the main differential member 32e after it moved upward by six steps. With the differential member so positioned, control disc 1090 is adjusted so that lever 1088, cooperating with said disc, holds the slip printer disengaged, while the control disc 976 is moved so that notch 977 lies underneath pin 975 of lever 974, which is now free to enter this notch (Fig. 131). Thereby the arm 969 (Fig. 118) connected to lever 974 causes the actuators of the amount printing hammer 936 (Fig. 117) and the short check feed device to be coupled with wheel 962 which is always driven. While the individual items of the multiple-item transaction are entered, these two devices are coupled and actuated respectively. During this operation, the shaft 92 (Fig. 131) is not rotated, and therefore bail 1036 cannot follow lever 974, and the actuators of the date and electro printing hammers 937 and 938, for the long check feed, and the cutting device are not coupled. The control key bank controlled type wheel 747c, causes the sign "+" to be printed on the audit strip to indicate that the recorded item belongs to a multiple-item transaction, and an itemized check was issued.

In taking a total of a multiple-item transaction, the key 21, still held depressed, stops the main differential member 32e of the control key bank, so that the control discs 976, 1090 maintain the former setting, whereby the slip printer is held disengaged, while for the check printer the actuators of the amount printing hammer 936 and the short check feed are operatively positioned. As in this machine operation shaft 92 is rotated, bail 1036 follows lever 974 and thereby connects the actuators for the date and the electro printing hammers 937 and 938 and the long check feed and the check cutting device

to the machine drive (wheel 1024). Consequently, the completely printed itemized check is issued.

If a slip has been inserted improperly, a stop pin 624a, described later, will be brought into the path of the main differential member 32e. This however, does not affect the printing device, for the main differential member 32e, if moving upward, cannot reach this stop pin, because it is arrested by the depressed key 21 and engages the check printer accordingly.

(e) *Single-item transaction and slip printing*

If a single-item transaction is to be recorded and no key of the control key bank is depressed, the check printer, after a slip is inserted, has to be disengaged and the slip printer to be engaged. As beforementioned, upon releasing the machine, lever 1097 (Figs. 61 and 74) is rocked counterclockwise, provided the slip feeler 1140 strikes the slip inserted. Rocking the lever 1097 causes the parts 1092—1108 (see also Fig. 129) to rock the slotted lever 1109 in clockwise direction, due to which the upper end of the slot in lever 1109 contacts the roller 1110.

When, then, the cam discs 1116, 1117 (Fig. 30) actuate the angular lever 1111, roller 1110 is not able to give way, but acts as pivot for angular lever 1111 having a pin 1118 which now rocks lever 1119 and, in connection therewith, shaft 250 in clockwise direction. At the other end, shaft 250 carries an arm 621 carrying a long lever 622 (Figs. 33, 34, and 80). Near its lower end, said lever is carried by an angular lever 624 pivoted at 625. The lower end of the long lever 622 has a roller 623 moving before the slide surfaces of two stop levers 627 and 628 carried also by the stud 625. Under the action of spring 631, the hooked extension of the stop lever 627 bears on pin 632 of the multiple-item key 22, while under tension of spring 633 the hooked extension of lever 628 contacts with pin 634 of the multiple-item key 23. Under such condition, the bent over portions 627a, 628a are out of the path of the main differential member 32e.

When upon actuating the abovementioned cam discs 1116 and 1117 in an operation wherein a slip is in the machine, the shaft 250 is rotated clockwise, which causes the long lever 622 to be moved down, and the angular lever 624 to be rocked, so that a flattened pin 624a on its upper arm is moved into the path of the main differential member 32e. Roller 623 is then removed from the stop levers 627 and 628 which are unable to follow, for their hook extensions contact the pins 632 and 634 of the keys 22 and 23 which are not depressed. In this single-item transaction and slip printing machine operation, the upward movement by seven steps of the main differential member 32e is defined by stop pin 624a. Through the appropriate special differential device, this motion is transmitted to the two control discs 976 and 1090; and the type wheels 747a—c as well. At this time, the portion of the control disc 976 between the two notches 977 and 978 comes to lie underneath pin 975 of lever 974 (Fig. 61), thus preventing the check printer from being connected to the machine drive. On the other hand, the notch 1092 of control disc 1090 faces the projection of lever 1088, which, consequently, is able to rock counterclockwise and free the path of pin 1086 of the angular lever 1085. As the slip inserted caused the pin 1096 to be moved out of the path of arm 1095, spring 1087 can now rock shaft 1080 and levers 1085,

1095 and 1082 in clockwise direction whereby the coupling disc 1076 is so turned that its single tooth is moved into the path of the initiating tooth 1075. Through the gear 1071 and the cam discs 1068 and 1069 (Fig. 46B) the wheel 1072 actuates the slip printer. At this time the sign “—” is printed, in addition to the other data, from the type wheels 747b, 747c set each time, to identify the print as a single-item record, and to indicate that a slip was printed in connection with it.

If, in recording a single-item transaction and slip printing, the “Check off” key 25 is depressed, then, independently of whether it is a cash sale or charge sale, or an amount paid out, always the slip inserted is imprinted, for the main differential member 32e, when moving upward, strikes, first, in the seventh position, the stop pin adjusted by the slip feeler, and does not reach the shaft 48 or pin 603, which are in the ninth and eighth positions respectively.

If, however, the “Multiple-item check” printing key 21 is depressed, and a slip was put in erroneously, this slip will not be printed, because, in spite of stop pin 624a being adjusted in the seventh position, the main differential member 32e is held by the depressed key 21 before it reaches this stop. Thus the printer is conditioned for check printing.

(f) *Slip printing in connection with multiple-item transactions*

In connection with multiple-item transactions, wherein slips are used instead of issuing a check from the check strip, different kinds of receipt slips are printed upon, in accordance with two selling systems:

(1) The customer purchases different articles in different departments, and the sales person writes separate slips, one for each article (Figs. 67 and 69). The customer takes the slips to the cashier's booth where the individual slips are run through the machine and receipted. To condition the machine for such slip printing, the item key 22 has to be depressed.

(2) The customer buys different articles which, however, are recorded on one single slip by the sales person. When the customer pays, the individual items are run one after another into the machine, the slip however is inserted only when the total is taken, and the total only is printed on it. Key 23 is used for slip printing in connection with multiple-item total taking.

Totalizing a number of single-item slips

If the amounts from a number of single-item slips are to be totalized, key 22 (Figs. 79 and 80) is depressed, from which it results that the key pin 632 releases the stop lever 627, which, however, initially, is held in its position by roller 623 of the long lever 622. Upon operating the motor bar, and the insertion of a slip, the rotation of the shaft 250 is prepared and performed at the start of the machine operation. As a result the long lever 622 is moved downwardly. Under the action of spring 631, the stop lever 627 follows, its bent over portion 627a enters the path of the main differential member 32e and stops it after it has moved upwardly by two units. Due to this, the control discs 976 and 1090 are so adjusted that disc 976 holds the check printer disengaged by means of the lever 974, while the notch 1091 of control disc 1090 faces the rounded projection of arm 1088 and thus allows the latter to move to the right. As the inserted slip causes the lever

1097 (Fig. 61) to rock counter-clockwise, spring 1087 rotates the shaft 1080 and the levers 1085, 1095 and 1082 clockwise, whereby the coupling disc 1076 is operatively positioned. As a consequence, the slip printer is actuated and the sign "±" printed beside the other data to indicate that a multiple-item is recorded and a slip was printed in connection with it.

If, inadvertently, no slip was inserted, the long lever 622 is not moved down and the stop lever 627 is not rocked into effective position. In this case, the main differential member 32e had been moved upwards by five steps to contact the depressed key 22, and the two control discs 976 and 1090 are so adjusted that no notch is opposite the appropriate control levers 974 and 1088 respectively. Consequently, check and slip printing is prevented, and the sign "+" would appear on the audit strip, beside the other data to indicate that a multiple-item record without a check or slip was printed.

After all sales slips handed to the customer, are imprinted with the mounts, and these amounts are entered into the machine, the multiple-item total is taken. For this operation, no slip is inserted. Therefore, during this total taking operations, the shaft 250 and, in connection with it, the long lever 622 are not moved owing to the absence of a slip and hence the roller 623 holds the stop levers 627 and 628 in ineffective position. Consequently, the main differential member 32e can be moved to contact the depressed key 22. The so positioned main differential member 32e causes the control discs 976 and 1090 to be adjusted so that they prevent, in the manner described, check and slip printing.

If, at this time, a slip was improperly inserted, roller 623 of the long lever 622 frees the stop lever 627 which was released also from the pin 632 of the depressed key 22. However, this stop lever is not permitted to become effective, since the superfluously printed slip might be used dishonestly. For this reason, moving this stop lever into operative position is obstructed in this machine operation by the following device:

Shaft 200, which, as described already, is rocked counter-clockwise only in total taking, has secured thereto a ball 636 (Figs. 33 and 34) having an arm 637 extending into the plane, but being normally out of the path of a pin 638 of the stop lever 627. Normally, this arm 637 does not obstruct the movement of the stop lever 627. Only in total taking, when it is rocked together with shaft 200, it moves before the pin 638 and prevents the stop lever 627 from moving into operative position. Consequently, in this case, even with a slip inserted, the multiple-item total will not be printed on the slip, but only on the audit strip and the sign "+" will be printed additionally, because the main differential member 32e is also held by the key 22 in this machine operation.

Multiple-item slip

In computing a series of items entered on one single slip (Fig. 68), the individual amounts are entered into the machine, but the slip will not be imprinted upon. For this purpose, key 23 is depressed, and pin 634 thereon releases the stop lever 628. The latter, however, cannot obtain its effective position, as it is held disengaged by the roller 623 of the long lever 622, because the absence of a slip in the chute prevents the long lever from being moved down. Thus the main differential member 32e is permitted to move by

four steps to contact the stem of the depressed key 23, which causes the control discs 976 and 1090 to be so adjusted that no notch of said discs lies opposite the control levers 974 and 1088 respectively. As a consequence, the check and the slip printing devices are disabled and the sign "+" is printed on the audit strip beside this record to indicate an item of a multiple-item transaction without a check or slip being printed in connection with it.

If, for dishonest purposes, a slip is inserted, the long lever 622 and the roller 623 are moved down, so that the stop lever 628 is released from the key pin 634 and the roller 623. Spring 633, however, is not able to rock the stop lever 628 because the flange portion 628a of the lever 628 is opposite the nose of a lever 641 carried by the stationary stud 640, and held by a pin 642 of the ball arm 637, normally, in the position shown in Fig. 33. As the stop lever 628 is not in operative position, the main differential member 32e is free to move into contact with the stem of the depressed key 23, whereby, as mentioned, the check and the slip printing devices are kept disengaged.

In taking the respective multiple-item total, slip printing has to be effected by the aid of shaft 200. The latter, as stated, is rotated counter-clockwise in total taking. Pin 642 of arm 637 fast on said shaft rocks the lever 641 in clockwise direction about its pivot 640. Thereby its nose is moved out of the path of the flange 628a, so that the stop lever 628 can now be rocked into effective position, in which it stops the main differential member 32e after a two step upward movement. With the main differential member so positioned the notch 1091 is opposite the control lever 1088 and thus the slip printer is coupled and actuated and consequently the slip is printed in the manner shown in Fig. 68, the sign "±" being printed on slip and audit strip.

If, erroneously, no slip was inserted, the long lever 622 and the roller 623 are not moved down, so that the stop lever 628 cannot be rocked into operative position. Consequently, the depressed key 23 stops again the main differential member 32e which in this position disables the check and slip printing devices.

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

What is claimed is:

1. In a machine of the class described, in combination with a plurality of printing platens to take impressions onto issuing record material to form a receipt, a multiple-item receipt issuing means, a multiple-item key, a main operating shaft, and amount keys, of a rockable shaft, a driving connection between the rockable shaft and the main operating shaft said connection being normally disconnected from the main operating shaft, connecting means positionable to one position upon depression of the multiple-item key to connect the driving means to the main operating shaft, a second rockable shaft normally rockable, means positioned upon depression of an amount key to cause the rocking movement of the second rockable shaft, connections between the second rockable shaft and the connecting means to position the connecting

means, to another position, upon rocking of the second rockable shaft, to disconnect the connecting means from the main operating shaft to prevent rocking movement of the first named rockable shaft when an amount key is depressed for a machine operation, operating means for one platen, a second operating means for the other platens, control means settable under control of the multiple-item key, a device adjustable under the control of the control means, a coupling means controlled by the device when adjusted to one position under control of the control means to couple the operating means for said one platen to the main operating shaft, and a second coupling means controlled jointly by the said adjustable device and by the first rockable shaft to couple the second operating means to the main operating shaft to cause all of the other of said platens to be operated when no amount key is depressed upon operating the machine with the multiple-item key depressed.

2. In a machine of the class described adapted to print and issue multiple-item and single-item receipts, in combination with a plurality of printing platens, amount keys for setting up data to be printed, and a control differential, of a stop to automatically arrest the control differential in a certain position; a control device settable under control of the control differential into a position corresponding to the said certain position of the control differential; a rockable shaft; a main operating shaft; a normally disconnected operating means between the rockable shaft and the main operating shaft; means controlled by the depression of one of the amount keys to render the operating means effective to rock the rockable shaft during a machine operation in which the amount keys are depressed; and means operable under the joint control of the control device and the rockable shaft to actuate the printing pistons.

3. In a machine of the class described adapted to print and issue multiple-item and single-item receipts, in combination with a plurality of printing platens, amount keys for setting up data to be printed, and a control differential, of a stop to automatically arrest the control differential in a certain position; a control device settable under control of the control differential into a position corresponding to the said certain position of the control differential; a rockable shaft; a main operating shaft; a normally disconnected operating means between the rockable shaft and the main operating shaft; means controlled by the depression of one of the amount keys to render the operating means effective to rock the rockable shaft during a machine operation in which the amount keys are depressed; a plurality of normally ineffective operating means to actuate the printing platens; and means under the joint control of the control device and the rockable shaft to render the plurality of operating means effective to operate the printing platens.

4. In a machine of the class described adapted to print and issue multiple-item and single-item receipts, in combination with a plurality of printing platens, amount keys for setting up data to be printed, and a control differential, of a stop to automatically arrest the control differential in a certain position; a control device settable under control of the control differential into a position corresponding to the said certain position of the control differential; a rockable shaft; a main operating shaft; a normally disconnected

operating means between the rockable shaft and the main operating shaft; means controlled by the depression of one of the amount keys to render the operating means effective to rock the rockable shaft during a machine operation in which the amount keys are depressed; two operating means for the printing platens; coupling devices to couple the operating means to the main shaft; and means under the joint control of the control device and the rockable shaft to actuate the coupling devices to connect the two operating means to the main shaft.

5. In a machine of the class described adapted to issue multiple-item and single-item receipts, in combination with amount keys for setting up data to be printed, and a control differential, of a stop to automatically arrest the control differential in a certain position; a control device settable under control of the control differential into a position corresponding to the said certain position of the control differential; a rockable shaft; a main operating shaft; a normally disconnected operating means between the rockable shaft and the main operating shaft; means controlled by the depression of one of the amount keys to render the operating means effective to rock the rockable shaft during a machine operation in which the amount keys are depressed; a paper feeding means to issue the receipt from the machine; and means operable under the joint control of the control device and the rockable shaft to actuate the feeding means.

6. In a machine of the class described adapted to issue multiple-item and single-item receipts, in combination with amount keys for setting up data to be printed, and a control differential, of a stop to automatically arrest the control differential in a certain position; a control device settable under control of the control differential into a position corresponding to the said certain position of the control differential; a rockable shaft; a main operating shaft; a normally disconnected operating means between the rockable shaft and the main operating shaft; means controlled by the depression of one of the amount keys to render the operating means effective to rock the rockable shaft during a machine operation in which the amount keys are depressed; a receipt issuing means; a plurality of normally ineffective operating means to actuate the receipt issuing means; and means under the joint control of the control device and the rockable shaft to render the plurality of operating means effective to operate the issuing means.

7. In a machine of the class described adapted to print and issue multiple-item and single-item receipts, the combination with amount keys for setting up data, and a control differential, of a stop to automatically arrest the control differential in a certain position; a control device settable under control of the control differential into a position corresponding to the said certain position of the control differential; a rockable shaft; a main operating shaft; a normally disconnected operating means between the rockable shaft and the main operating shaft; means controlled by the depression of one of the amount keys to render the operating means effective to rock the rockable shaft during a machine operation in which the amount keys are depressed; a receipt-issuing means; two operating means for actuating the receipt-issuing means; coupling devices to couple the operating means to the main operating shaft; and means under the joint control of the control device and the rockable shaft

to actuate the coupling devices to connect the two operating means to the main operating shaft.

8. In a machine of the class described, in combination with a plurality of sets of type carriers, and a printing platen associated with each set of type carriers, of an eccentric bearing to support each printing platen; an operating means for each printing platen adapted to oscillate the printing platens in a back-and-forth movement on said bearings once during each machine operation; means to selectively operate one or all of the operating means to oscillate one or all of the printing platens to take impressions from the type carriers; and means to rotate all of the eccentric bearings during each machine operation, regardless of whether one or all of the printing platens are operated, to move the printing platens relatively to the type carriers to prevent taking an impression from the type carriers during one of the said oscillating movements of the operated printing platens.

9. In a machine of the class described, in combination with a plurality of sets of type carriers, and a printing platen associated with each set of type carriers, of an operating means for each printing platen to oscillate the printing platens through a back-and-forth movement during an operation of the machine; means to determine which or all of the printing platens are to be oscillated; a rotatable eccentric bearing for each printing platen which when in one position of adjustment locates the printing platens relatively to the type carriers to take impressions from the type carriers onto record material; an actuating means; and a connecting means to connect all of the eccentric bearings to said actuating means whereby all of the eccentric bearings are simultaneously moved from said one position of adjustment into another position to alter the relative position between the type carriers and the platens to prevent taking an impression during one of said movements, said actuating means operable during each machine operation regardless of whether one or all of said operating means for the printing platens are effective.

10. In a machine of the class described, in combination with a plurality of sets of type carriers, a printing platen for each set of type carriers, and a main operating shaft, of a normally ineffective operating means for each printing platen to oscillate the printing platen through a back-and-forth movement during a machine operation; coupling means to couple one or all operating means to the main operating shaft; amount keys; control keys; means controlled jointly by the amount keys and control keys to determine whether one or all operating means are to be coupled to the main operating shaft to render one or all operating means effective; a rotatable eccentric bearing for each printing platen which when in one position of adjustment locates the printing platens relatively to the type carriers to take impressions from the type carriers onto record material and when in another position of adjustment locates the printing platens relatively to the type carriers to prevent taking impressions from the type carriers; an actuating means; and a connecting means to connect all of the eccentric bearings to said actuating means whereby all of the eccentric bearings are simultaneously moved from said one position of adjustment into said another position to alter the relative position between the type carriers and the platens to prevent taking an impression during one of said movements, said actuating means operable dur-

ing each machine operation regardless of whether one or all of said operating means for the printing platens are effective.

11. In a machine of the class described, in combination with a plurality of sets of type carriers, a printing platen associated with each set of type carriers, and a main operating shaft, of a normally ineffective operating means for each printing platen to oscillate the printing platens through a back-and-forth movement and thereby take impressions from the type carriers; a mutilated gear normally disconnected from the main operating shaft associated with each operating means; amount keys; control keys; means under joint control of the amount keys and control keys to initiate movement of one or all of the mutilated gears; means on the main operating shaft coacting with the mutilated gears after movement thereof has been initiated to couple one or all of the operating means to the main operating shaft; a rotatable eccentric bearing for each printing platen which when in one position of adjustment locates the printing platens relatively to the type carriers to take impressions from the type carriers onto record material; an actuating means; and a connecting means to connect all of the eccentric bearings to said means whereby all of the eccentric bearings are simultaneously moved from said one position of adjustment into another position to alter the relative position between the type carriers and the platens to prevent taking an impression during the one of said movements of the platens, said actuating means operable during each machine operation regardless of whether one or both of said operating means for the printing platens are effective.

12. In a machine of the class described, in combination with a receipt-issuing mechanism, printing platens to take impressions on the issuing receipt, and a differential mechanism, of a control element settable into a plurality of positions out of a normal position by the differential mechanism to control the effectivity of the issuing mechanism and of the printing platens; means to normally arrest the differential mechanism in a position to set the control element into a position in which the receipt-issuing mechanism and printing platens are operated; a receptacle to receive an insertable slip; a slip feeler; and means settable under control of the slip feeler when a slip is in the receptacle to arrest the differential mechanism in another position to set the control element into a position in which the receipt-issuing mechanism and printing platens are not operated.

13. In a machine of the class described, in combination with a normally ineffective receipt-issuing mechanism, and a control differential mechanism movable from a normal position into a plurality of adjusted positions, of a stop normally in position to arrest the differential in one position out of normal position; a second stop normally in ineffective position which when moved to its effective position arrests the differential mechanism in another position out of its normal position; a control element settable into a plurality of positions out of a normal position under control of the differential mechanism; a follower means coacting with the control element; means operable under control of the follower means to render the receipt-issuing means effective when the differential is arrested in the first-named position and to maintain the receipt-issuing mechanism ineffective when the

differential is arrested in the second-named position by the second stop; a slip receptacle; a slip feeler projectable into said receptacle; and means operable under control of the slip feeler to move the second stop into its effective position when the slip feeler is arrested by a slip in the receptacle.

14. In a machine of the class described, in combination with a check-issuing mechanism, a control differential means movable from a normal position into a plurality of differentially set positions, a plurality of stops to automatically arrest the differential means in said plurality of different positions, and a main operating means, of a control member to determine the effectivity of the check-issuing means; connections between the control member and the differential means; a receptacle for an insertable slip; a feeling device adapted to enter the receptacle to sense the presence or absence of a slip in the receptacle; and connections operated by the main operating means and under control of the feeling device when the feeling device senses the presence of a slip to move a certain one of said stops into the path of the differential means to arrest the differential means in one of said differentially set positions to cause the positioning of the control member to prevent the issuing of a check.

15. In a machine of the class described, in combination with a differential means and a receipt-issuing mechanism movable from a normal position into a plurality of adjusted positions, of a normally effective stop and a normally ineffective stop to arrest the differential means in different adjusted positions; a control element settable differentially by the differential means to a position to cause the receipt-issuing mechanism to issue a receipt when the differential means is arrested by the normally effective stop, and to another position to prevent the receipt-issuing mechanism from issuing a receipt when the differential means is arrested by the normally ineffective stop; a receptacle for an insertable slip; a sensing device to coact with an insertable slip when inserted into the receptacle; and means settable under control of the sensing device to render the normally ineffective stop effective, to thereby prevent issuing a check when a slip is in the receptacle.

16. In a machine of the class described, in combination with a differential means and a receipt-issuing mechanism, of a normally effective stop and a normally ineffective stop to arrest the differential means in different positions; a control element settable differentially by the differential means to a position to cause the receipt-issuing mechanism to issue a receipt when the differential means is arrested by the normally effective stop and to another position to prevent the receipt-issuing mechanism from issuing a receipt when the differential means is arrested by the normally ineffective stop; a receptacle for an insertable slip; a sensing device to coact with an insertable slip when inserted into the receptacle; a main operating shaft; operating means normally disconnected from the main operating shaft to move the normally ineffective stop into effective position; and means settable under control of the sensing means to connect the operating means to the main operating shaft whereby the normally ineffective stop is moved into effective position during the machine operation to prevent the check-issuing means from operating during an operation in which a slip is in the receptacle.

17. In a machine of the class described, in combination with a differential means and a receipt-issuing mechanism, of a normally effective stop and a normally ineffective stop to arrest the differential means in different positions; a control element settable differentially by the differential means to a position to cause the receipt-issuing mechanism to issue a receipt when the differential means is arrested by the normally effective stop and to another position to prevent the receipt-issuing mechanism from issuing a receipt when the differential means is arrested by the normally ineffective stop; a receptacle for an insertable slip; a sensing device to coact with an insertable slip when inserted into the receptacle; a main operating means; mechanism between the main operating means and the normally ineffective stop including a loose connection to normally prevent rendering the normally ineffective stop effective; an arm movable to coact with the loose connection to render the loose connection an operating connection; and connections operable under control of the sensing means when the sensing means senses the presence of a slip to move said arm into coacting position with said loose connection to thereafter cause the main operating means to move the normally ineffective stop into its effective position to prevent the issuing means from issuing a check.

18. In a machine of the class described, in combination with a differential means and a receipt-issuing mechanism, of a normally effective stop and a normally ineffective stop to arrest the differential means in different positions; a control element settable differentially by the differential means to a position to cause the receipt-issuing mechanism to issue a receipt when the differential means is arrested by the normally effective stop and to another position to prevent the receipt-issuing mechanism from issuing a receipt when the differential means is arrested by the normally ineffective stop; a receptacle for an insertable slip; a sensing device to coact with an insertable slip when inserted into the receptacle; a main operating means; mechanism between the main operating means and the normally ineffective stop including an ineffective toggle connection; an arm movable into contact with the toggle to render the toggle connection effective; a machine release shaft; and connections operable by the machine release shaft and operable under control of the sensing means when the sensing means senses the presence of a slip in the receptacle to move said arm into contact with the toggle to thereafter cause the main operating means to move the normally ineffective stop into effective position to arrest the differential means in the position wherein the control member prevents operation of the check-issuing means.

19. In a machine of the class described, in combination with a differential means and a receipt-issuing mechanism, of a normally effective stop and a normally ineffective stop to arrest the differential means in different positions; a control element settable differentially by the differential means to a position to cause the receipt-issuing mechanism to issue a receipt when the differential means is arrested by the normally effective stop and to another position to prevent the receipt-issuing mechanism from issuing a receipt when the differential means is arrested by the normally ineffective stop; a receptacle for an insertable slip; a sensing device to coact with an insertable slip when inserted into the receptacle; means to operate the sensing means; a main operating

means; mechanism between the main operating means and the normally ineffective stop including an element normally pivoted for free movement; an arm movable into contact with said element to change the pivot point of the element; and connections between the sensing means and said arm whereby the arm is moved into contact with the said element when the sensing means senses the presence of a slip in the receptacle, said element, when thereafter moved by the main operating means, pivoting to operate said mechanism to move the normally ineffective stop into effective position to arrest the differential means in a position wherein the control member prevents operation of the check-issuing means.

20. In a machine of the class described, in combination with a check-issuing mechanism, a slip-printing mechanism, and a control differential, of a plurality of control elements differentially settable by the control differential, one of the control elements associated with the check-issuing mechanism to control the effectivity thereof and the other one of the control elements associated with the slip-printing mechanism to control the effectivity thereof; a plurality of stops to arrest the differential in various positions; a slip feeler; and means controlled by the slip feeler to selectively position the stops to determine the adjustment of the control differential.

21. In a machine of the class described, in combination with a control differential, and manipulative devices to control the differential positioning of the control differential, of a plurality of stops to control the differential positioning of the control differential; a slip receptacle; a slip feeler projectable into the slip receptacle to feel for an inserted slip; and connections between the slip feeler and the stops to control the position of the stops to determine whether the stops or the manipulative devices are to be effective to control the positioning of the control differential.

22. In a machine of the class described, in combination with a control differential, a plurality of normally undepressed keys to control the differential positioning of the control differential, a receptacle for a slip, and a slip feeler movable into the receptacle to feel for a slip, of a plurality of stops to control the differential positioning of the control differential, said stops normally held in ineffective positions by the undepressed keys; and connections between the slip feeler and the stops, said connections adapted to release one of the stops for movement into effective position when the feeler senses the presence of a slip in the receptacle as determined by a depressed key.

23. In a machine of the class described, in combination with a control differential, a plurality of keys to control the differential positioning of the control differential, a receptacle for a slip, and a slip feeler movable into the receptacle to feel for a slip, of a plurality of stops to control the differential positioning of the control differential, one of said stops being under the sole control of the slip feeler and the other of said stops being under the joint control of the control keys and the slip feeler, said one stop being located relatively to the control keys so as to be effective to arrest the differential when one of the control keys is depressed but not when another control key is depressed.

24. In a machine of the class described, in combination with a receipt issuing means, control mechanism to condition the machine for different

kinds of operations, and a main operating shaft; of a second operating shaft normally disconnected from the main operating shaft, means connected to the second operating shaft to actuate the receipt issuing means to feed the receipt a short distance to line-space the receipt, a coupling means to couple the second operating shaft to the main operating shaft, means actuated when the machine is conditioned for one kind of operation to couple the second operating shaft to the main operating shaft, a third operating shaft normally disconnected from the main operating shaft, means actuated when the machine is conditioned for another kind of operation to couple the third operating shaft to the main operating shaft, and a single means connected to the third operating shaft to actuate the receipt issuing means two times, each being a different extent.

25. In a machine of the class described, in combination with a multiple item receipt issuing means, control mechanism including a control key to control the machine for one kind of operation, a control means to control the machine for a second kind of operation, and a main operating shaft, of a second operating shaft normally uncoupled from the main operating shaft, means connected to the second operating shaft to operate the receipt issuing means to line space the receipt, coupling means to couple the second operating shaft to the main operating shaft, a differentially settable control element set under control of said control key, means settable in accordance with the setting of the control element to position the coupling means into the effective position, a third operating shaft, means operated by the third operating shaft to operate the receipt issuing means a greater extent than the extent of operation of the receipt issuing means by the second operating shaft, coupling means to couple the third operating shaft to the main operating shaft, a rockable shaft, means operated by the control key to control operation of the rocking means to cause the shaft to be rocked when the machine is controlled for said second kind of operation by said control means, and means under the joint control of the differentially settable control element and the rockable shaft to cause the last-named coupling means to be rendered effective to couple the third operating shaft to the main operating shaft.

26. In a machine of the class described, in combination with a receipt issuing means, control mechanism including a control key to control the machine for one kind of operation, a control means to control the machine for a second kind of operation, and a main operating shaft, of connections to operate the receipt issuing means an extent sufficient to line space the items, connections to operate the issuing means a greater extent, two coupling means, one of which is operable to couple one of said connections to the main operating shaft and the other of which is operable to couple the other of said connections to the main operating shaft, a rockable shaft, rocking means connected to the main operating shaft to rock the rockable shaft, means operated by the control key to connect the rocking means to the means connected to the main operating shaft when the machine is controlled for said second kind of operation by said control means, a control element settable under control of the control key, and means jointly controlled by the control element and the rockable shaft to cause a certain one of the coupling means to be effective,

27. In a machine of the class described, in combination with a receipt issuing means, control mechanism including a control key to control the machine for one kind of operation, a control means to control the machine for another kind of operation, and a main operating shaft, of connections to operate the receipt issuing means an extent sufficient to line-space items, said connections normally uncoupled from the main operating shaft, connections to operate the receipt issuing means a greater extent, the last-named connections normally uncoupled from the main operating shaft, two coupling means one of which is operable to couple one of said connections to the main operating shaft and the other of which is operable to couple the other of said connections to the main operating shaft, a rockable shaft, means including a cam operated during a machine operation to rock the rockable shaft, means operated by the control key to connect the last-named means to the rockable shaft to cause operation of the rocking means to rock the shaft when the machine is controlled for said second kind of operation by said control means, a notched disc settable under control of the control key, a feeler device controlled by the notched disc and released by the rockable shaft when the latter is rocked, and connections between the feeler device and a certain one of the coupling means to cause a certain one of the coupling means to be effective.

28. In a machine of the class described, in combination with a receipt issuing means, control mechanism including a control key to control the machine for one kind of operation, a control means to control the machine for another kind of operation, and a main operating shaft, of connections to operate the receipt issuing means an extent sufficient to line-space items during said one kind of operation, connections to operate the receipt issuing means a greater extent during said other kind of operation, both of said connections being normally disconnected from the main operating means, two coupling means one of which is operable to couple one of said connections to the main operating shaft and the other of which is operable to couple the other of said connections to the main operating shaft, a rockable shaft, means to rock the shaft, means operated by the control key to control operation of the rocking means to cause the shaft to be rocked when the machine is controlled for said other kind of operation by said control means, a notched disc settable under control of the first-named control key, a follower mechanism coacting with the notched disc to cause one of the coupling means to become effective, and means under the joint control of the rockable shaft and said notched disc to cause the other coupling means to become effective simultaneously with the first coupling means.

29. In a machine of the class described, in combination with printing platens to make impressions on issuing record material to form a receipt, a receipt issuing means, a multiple-item control key, and a main operating shaft, of amount manipulative devices for setting up items to be printed on the issuing strip; connections, normally disconnected from the main operating shaft, to operate the printing platens to print items and totals on the issuing strip and to feed the issuing strip a short distance to line-space the printed items; other connections normally disconnected from the main shaft to feed the issuing strip a short distance to space the printed

total from the last printed item and a greater distance to feed the issuing strip out of the machine; a settable control device settable under control of the multiple-item control key; a rockable shaft; means to rock the shaft; means operated jointly by the multiple-item control key and an amount key to control operation of the rocking means to cause the shaft to be rocked during a machine operation in which the multiple-item control key and an amount manipulative device are manipulated; and means coacting with the settable control device and the rockable shaft to connect one or both of said connections to the main shaft.

30. In a machine of the class described, in combination with a plurality of printing platens to take impressions onto an issuing record material to form a receipt, a multiple-item receipt issuing means, and a main operating shaft, of an operating means normally uncoupled from the main shaft and connected to one of said printing platens, said one platen being operable to print the items and totals of a multiple-item transaction; operating means normally uncoupled from the main shaft and connected to the other of said platens to cause said other platens to print other data when said one platen prints the total of the items of a multiple-item transaction; amount keys; a multiple-item key; a differentially settable means set under control of the multiple-item key; a rockable shaft; means adjusted under control of any one of the amount keys when depressed to cause operation of the rockable shaft; and means operable under the joint control of the differentially settable means when the settable means is set under control of the multiple-item key and the rockable shaft when rocked to cause only the first-named connection to operate, and to cause both of said connections to be coupled to the main shaft for operation when no amount key is depressed to cause all of the platens to operate.

31. In a machine of the class described, in combination with a plurality of printing platens to take impressions onto issuing record material to form a receipt, a multiple-item receipt issuing means, and a main operating shaft, of a first operating means normally uncoupled from the main shaft and connected to one of said printing platens, said platen being operable to print the items and totals of a multiple-item transaction; a second operating means normally uncoupled from the main shaft and connected to the other of said platens to cause said other platen to print other data when said one platen prints the total of the items of a multiple-item transaction; amount keys; a multiple-item key; a notched disc differentially settable under control of the multiple-item control key; means coacting with the notched disc to couple the first operating means to the main shaft for operation thereby to print items; a rockable shaft normally disconnected from the main shaft; means adjusted under control of any one of the amount keys to connect the rockable shaft to the main shaft to thereby cause operation of the rockable shaft during a machine operation; and means operable under the joint control of the notched disc when set under control of the multiple-item key and the rockable shaft to cause only the first-named operating means to be coupled to the main shaft for operation when an amount key is depressed, and to cause both of said operating means to be coupled to the main shaft when no amount key

is depressed and the rockable shaft is rocked, to cause all of the platens to operate.

32. In a machine of the class described, in combination with a plurality of printing platens to take impressions onto issuing record material to form a receipt, a multiple-item receipt issuing means, a multiple-item key, a main operating shaft, and amount keys, of a rockable shaft so controlled by the amount keys that the shaft is rocked only during a machine operation wherein an amount key is depressed but is not rocked when no amount key is depressed; an operating means for operating one of the printing platens; another operating means for operating all but said one printing platen; a control device settable under control of the multiple-item key; and means coacting with the control device and the rockable shaft to determine whether one or both of the operating means are to be rendered effective.

33. In a machine of the class described, in combination with a plurality of printing platens to take impressions onto issuing record material to form a receipt, a multiple-item receipt issuing means, a multiple-item key, a means settable by the multiple-item key when the multiple-item key is depressed, a main operating shaft, and amount keys, of a rockable shaft; means to rock said shaft, said rocking means being controlled jointly by the amount keys and the multiple-item key so that the shaft is rocked when no amount key is depressed and the multiple-item key is depressed, and so that the shaft is arrested when an amount key and the multiple-item key are depressed; normally inactive operating means to actuate one of said printing platens; control means adjusted under control of the multiple-item key to cause said operating means to be rendered active to operate said one printing platen when the multiple-item key is operated; a second normally inactive operating means to actuate all the printing platens except said one printing platen; and means under the joint control of said control means and the rockable shaft to cause said second operating means to be rendered active.

34. In a machine of the class described, in combination with a plurality of printing platens to take impressions onto issuing record material to form a receipt, a multiple-item receipt issuing means, a main operating shaft, and amount keys, of a rockable element stationary during a machine operation in which an amount key and a

multiple-item key are depressed but rocked during a machine operation in which the multiple-item key is depressed and no amount keys are depressed; a plurality of printing platens; an operating device to operate one of said printing platens; a second operating device to operate all the remaining printing platens, said operating devices being normally disconnected from the main shaft; and means settable under the control of the multiple-item key and the rockable element to connect one or both of the operating devices to the main shaft to operate one or both of the printing platens.

35. In a machine of the class described, in combination with a plurality of printing platens to take impressions onto issuing record material to form a receipt, a multiple-item receipt issuing means, a multiple-item key, a main operating shaft, and amount keys, of a first rockable shaft; a driving connection between the first rockable shaft and the main operating shaft, said connection being normally disconnected from the main operating shaft; connecting means positionable to one position upon depression of the multiple-item key to connect the driving means to the main operating shaft; a second rockable shaft normally rockable; means positioned upon depression of an amount key to cause the rocking movement of the second rockable shaft; connections between the second rockable shaft and the connecting means to position the connecting means to another position upon rocking of the second rockable shaft to disconnect the connecting means from the main operating shaft to prevent rocking movement of the first-named rockable shaft when an amount key is depressed for a machine operation; a first operating means for one platen; a second operating means for the other platens; and coupling means controlled by the first rocking shaft, when rocked, and by the depression of the multiple-item key to couple both of said operating means to the main operating shaft to cause all of the platens to operate when the first-named rockable shaft is rocked, said coupling means controlled by the first rocking shaft when it is not rocked and the multiple-item key is depressed to couple only the said first operating means to the main operating shaft to cause only said one platen to operate.

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CERTIFICATE OF CORRECTION.

Patent No. 2,279,858.

April 14, 1942.

ERNST BREITLING, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 35, strike out "of"; page 4, second column, line 63, for "tends" read --tens--; page 8, first column, line 26, for "pin 47" read --pin 147--; page 12, first column, line 1, for "256h" read --256l--; line 2, after "19," insert --and--; line 19, before "has" strike out "(Fig. 85)" and insert the same before "engaging", same line; page 22, first column, line 55, for "disc 11" read --disc 711--; and second column, line 13, for "blanks" read --banks--; page 32, first column, line 26, for "(Fig. 30)" read --(Fig. 130)--; and second column, line 41, for "the slips" read --these slips--; page 33, first column, line 23, for "mounts" read --amounts--; page 34, first column, line 41, claim 2, for "pistons" read --platens--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of June, A. D. 1942.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

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