May 10, 1938. E. BREITLING 2,116,779

CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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Fig. 1.

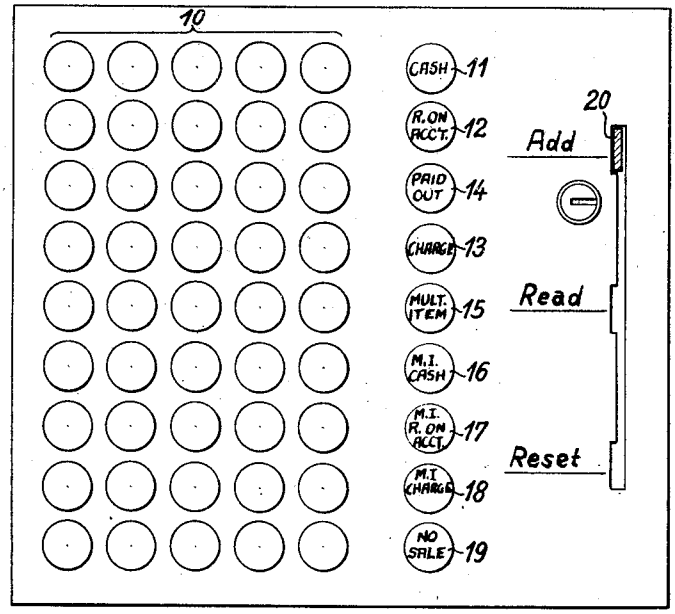
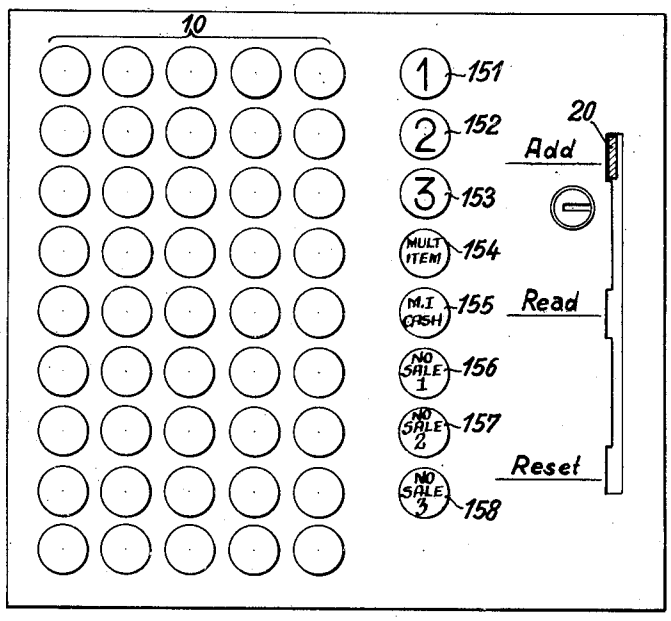


Fig. 24.



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May 10, 1938. E. BREITLING 2,116,779

CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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Fig. 2.

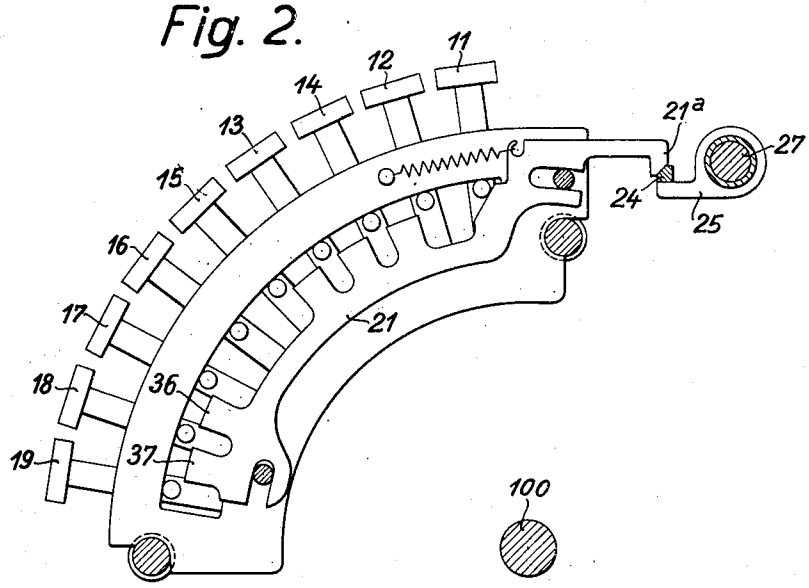
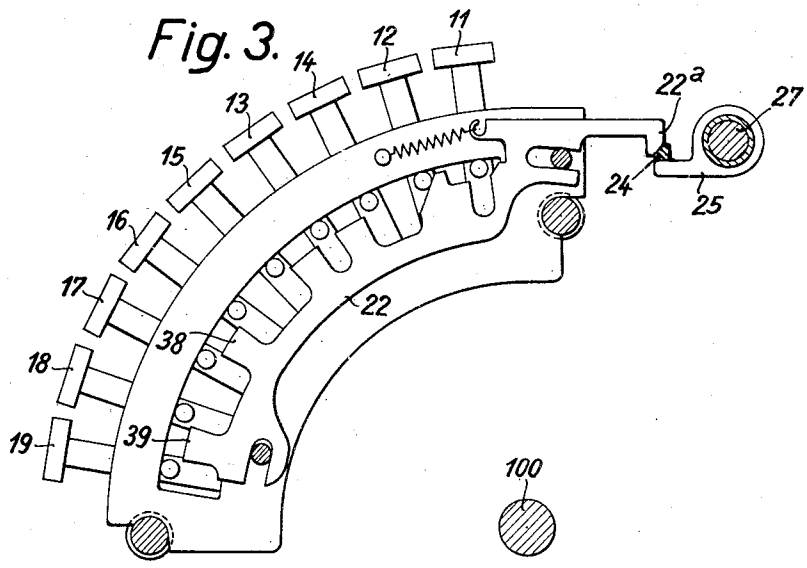


Fig. 3.



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May 10, 1938. E. BREITLING 2,116,779

CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

Filed Dec. 18, 1934 18 Sheets-Sheet 3

Fig. 4.

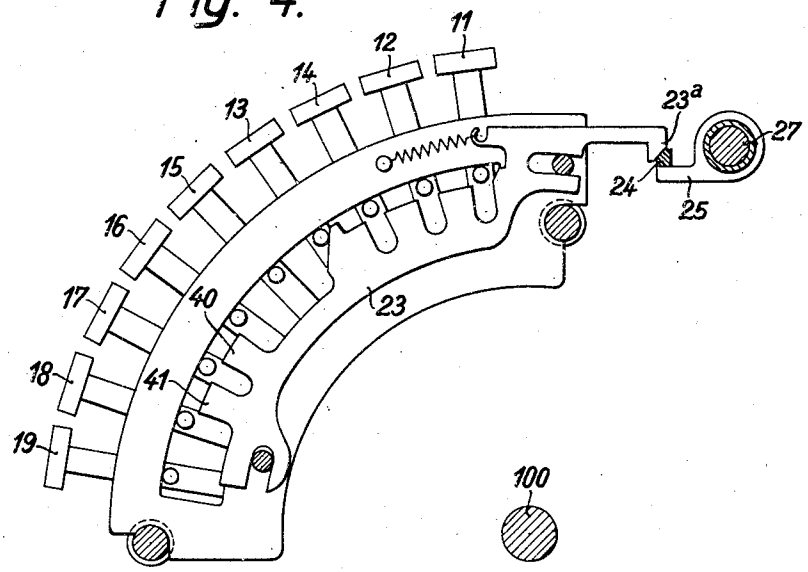
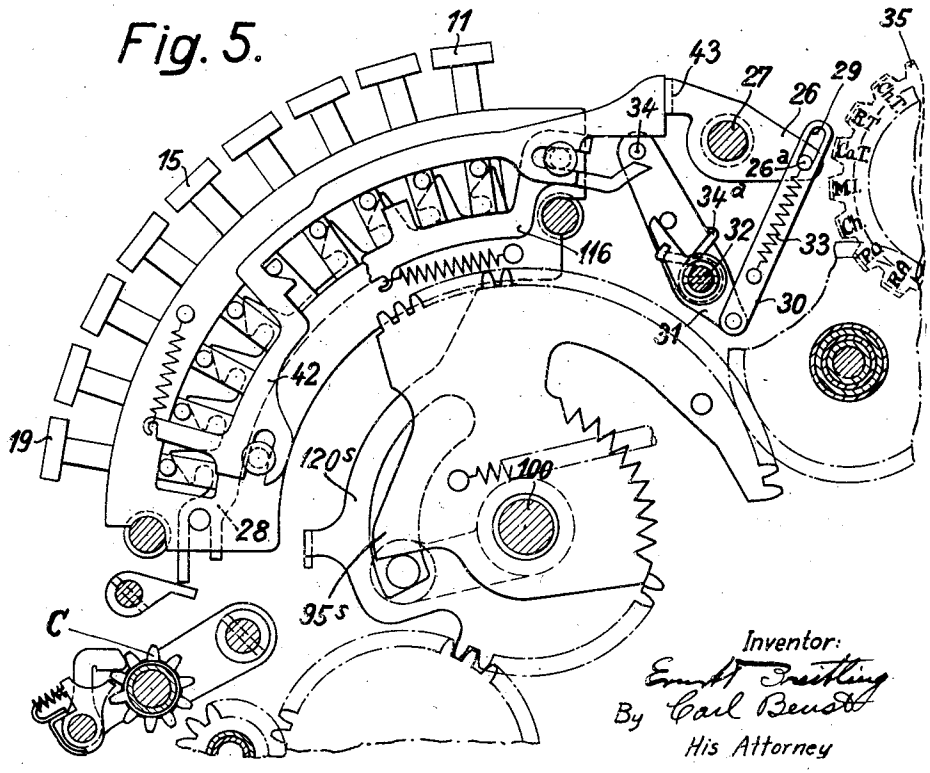


Fig. 5.



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May 10, 1938. E. BREITLING 2,116,779

CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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Fig. 6.

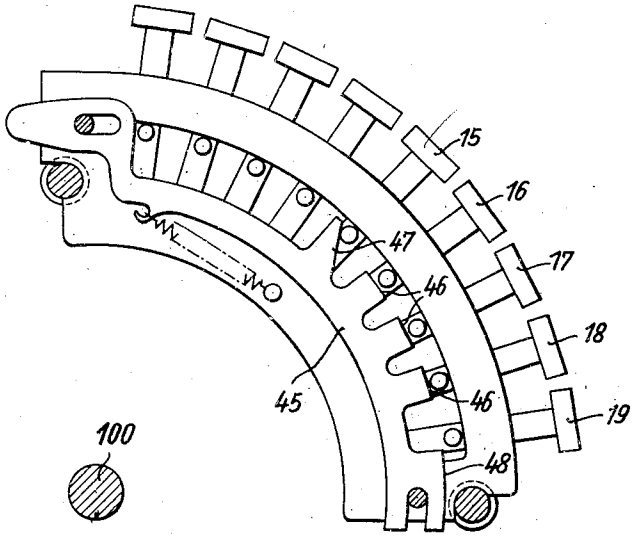
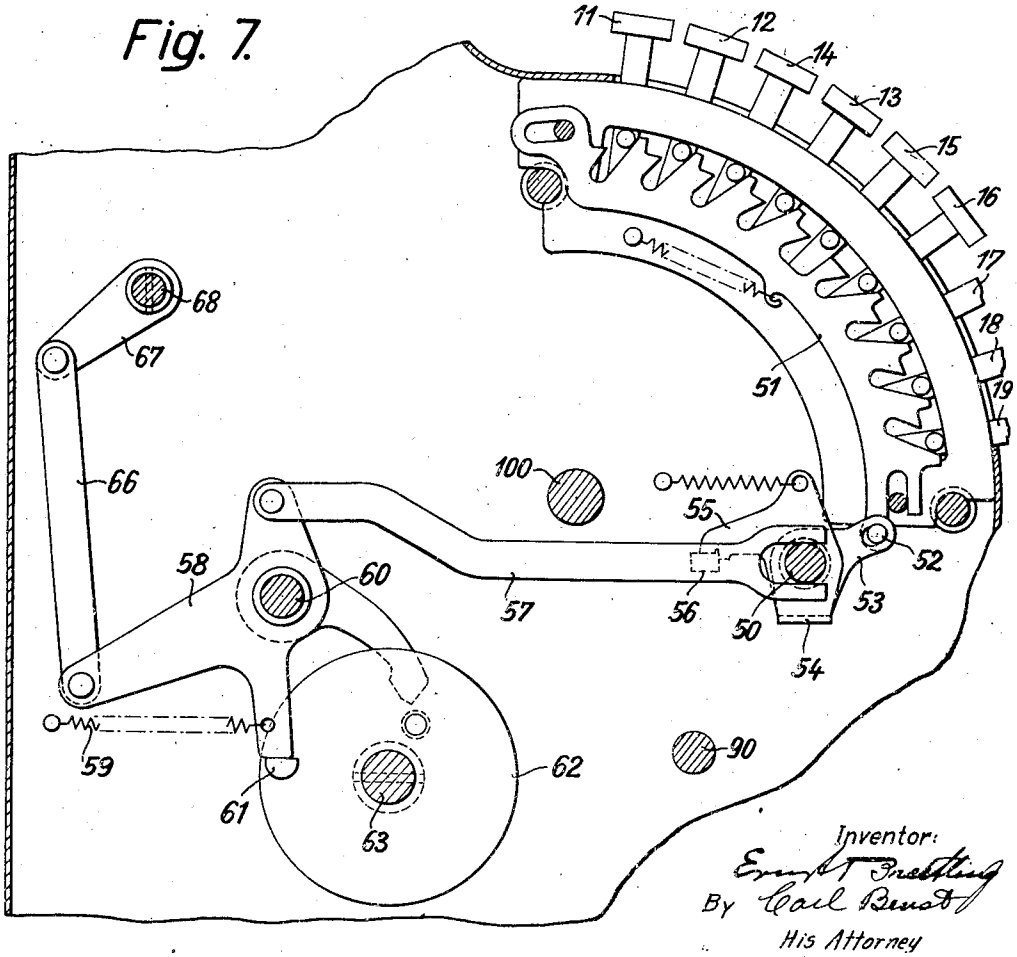


Fig. 7.



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May 10, 1938. E. BREITLING 2,116,779

CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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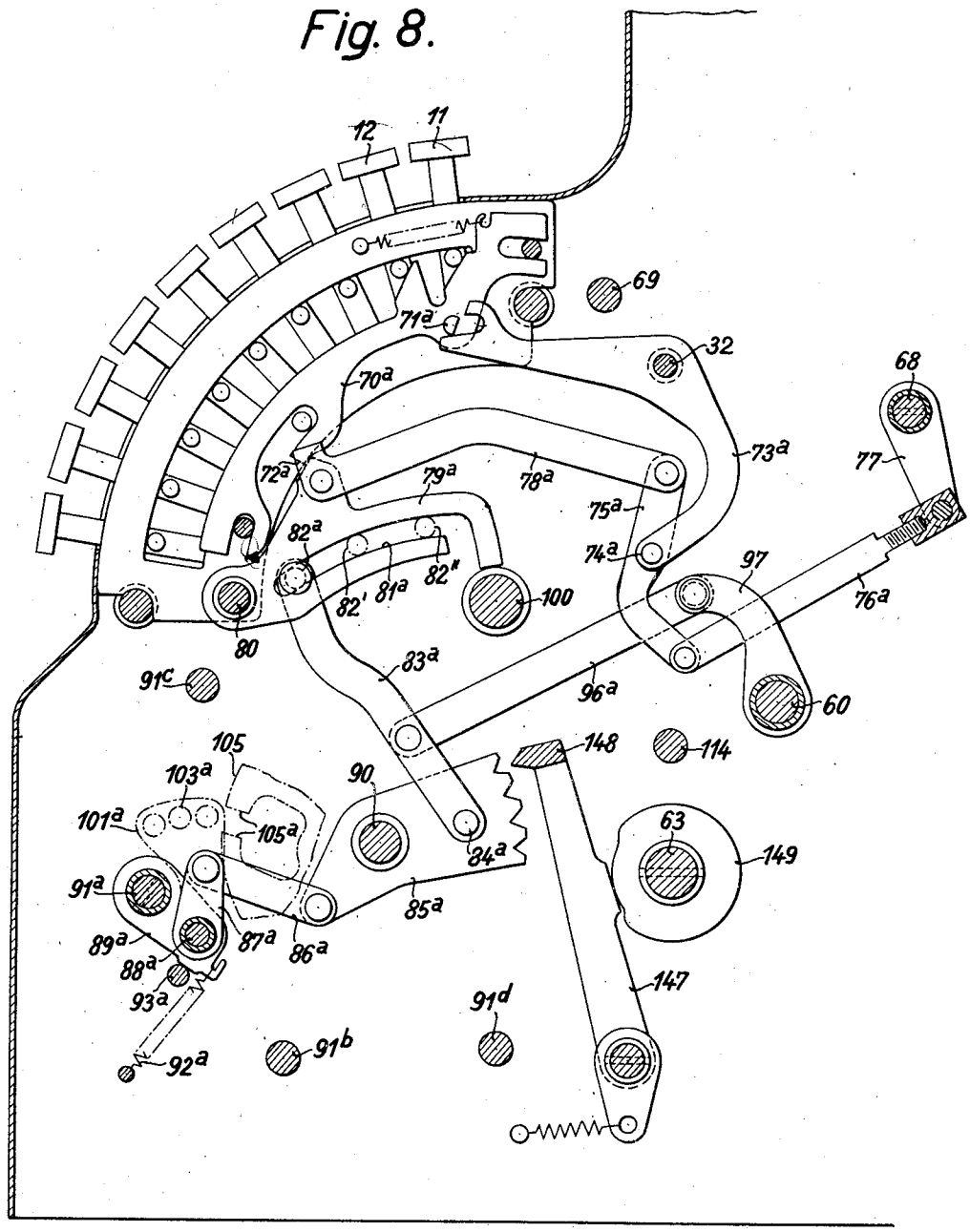
Fig. 8.



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CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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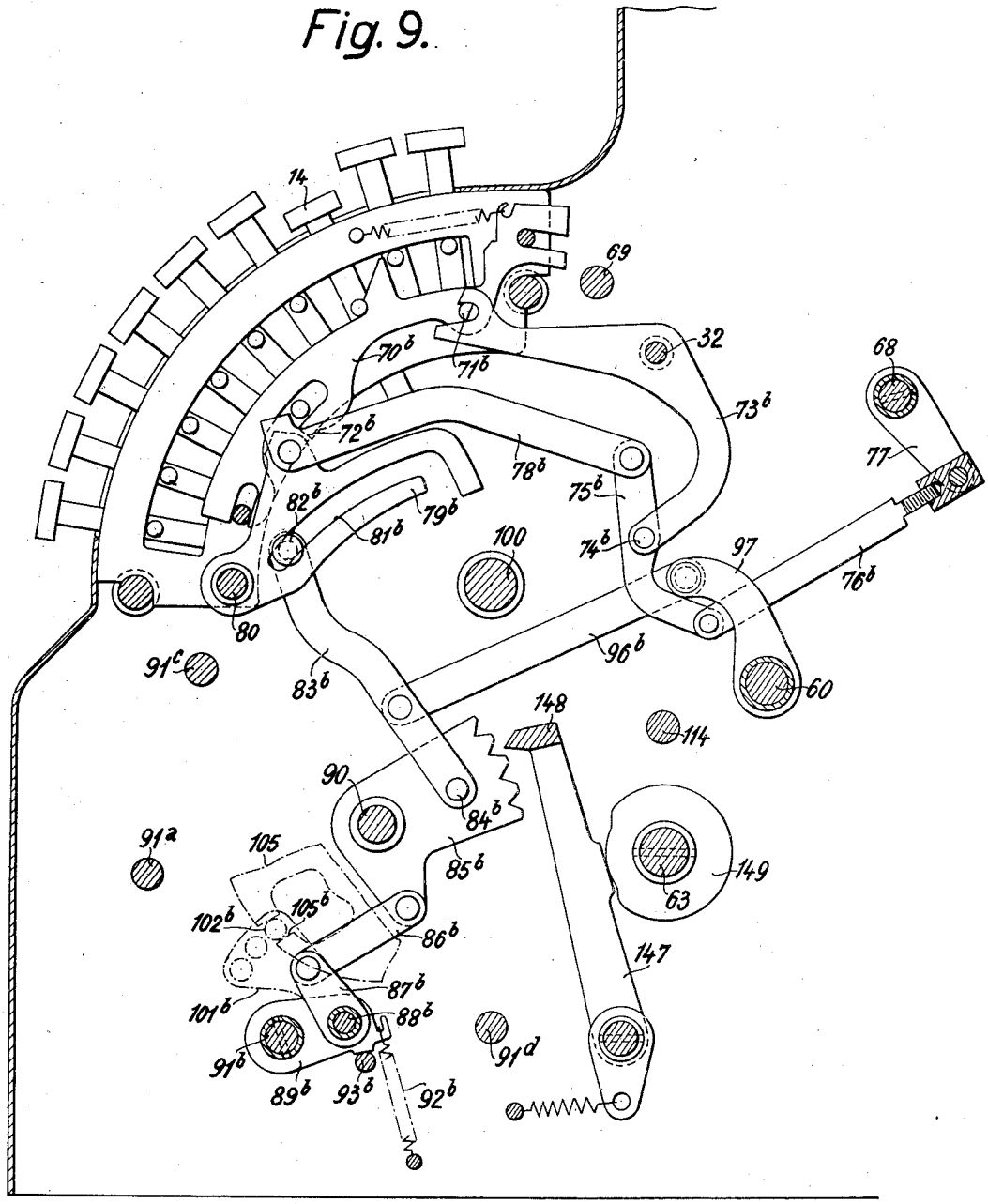
Fig. 9.



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CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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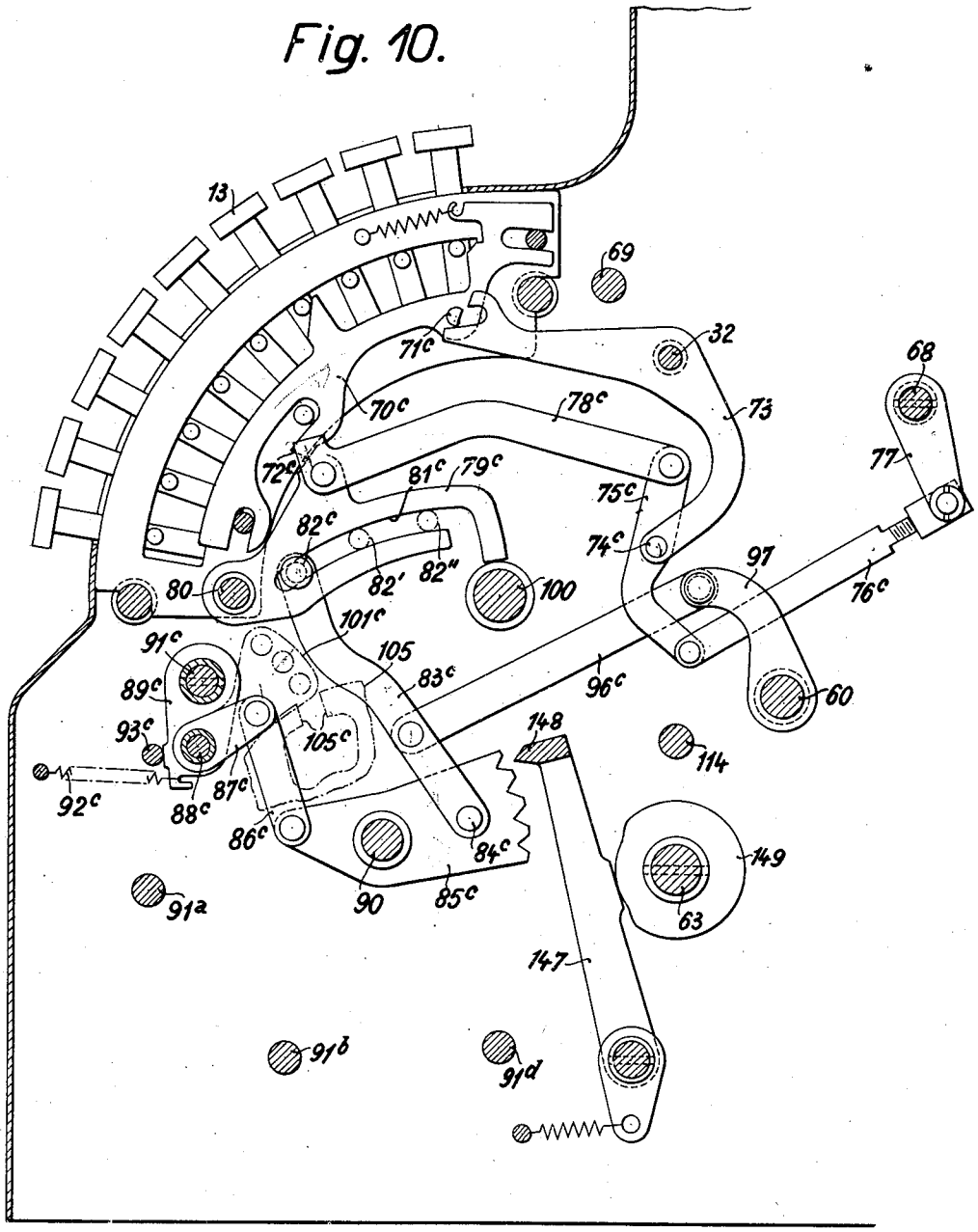
Fig. 10.



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CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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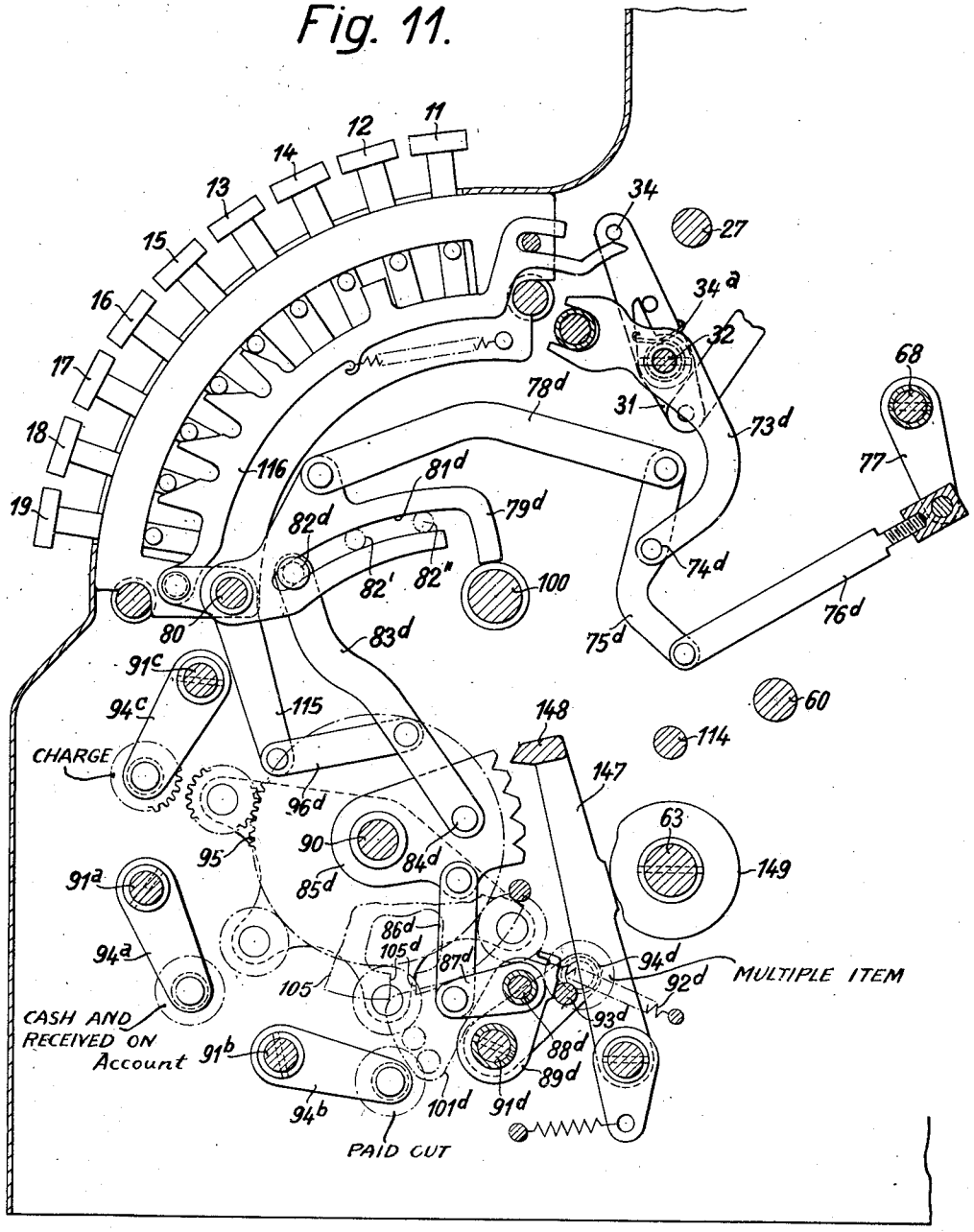
Fig. 11.



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May 10, 1938. E. BREITLING 2,116,779

CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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Fig. 12.

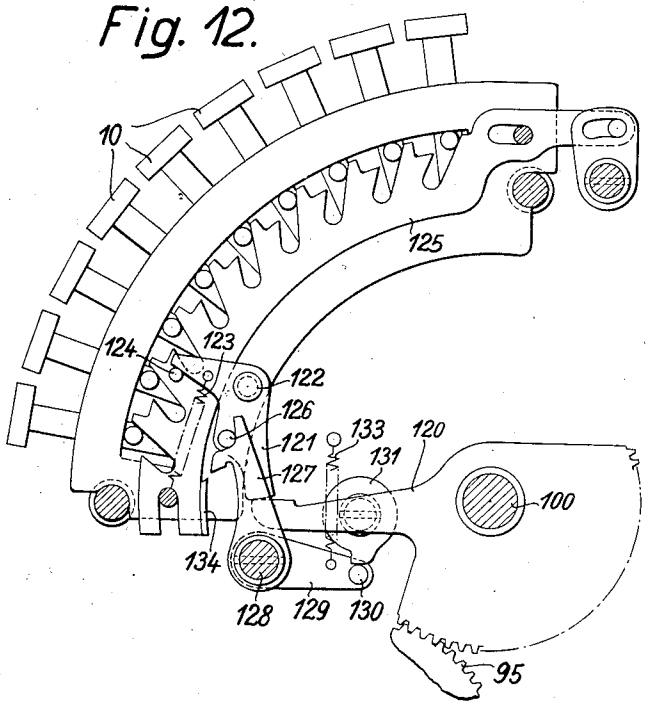
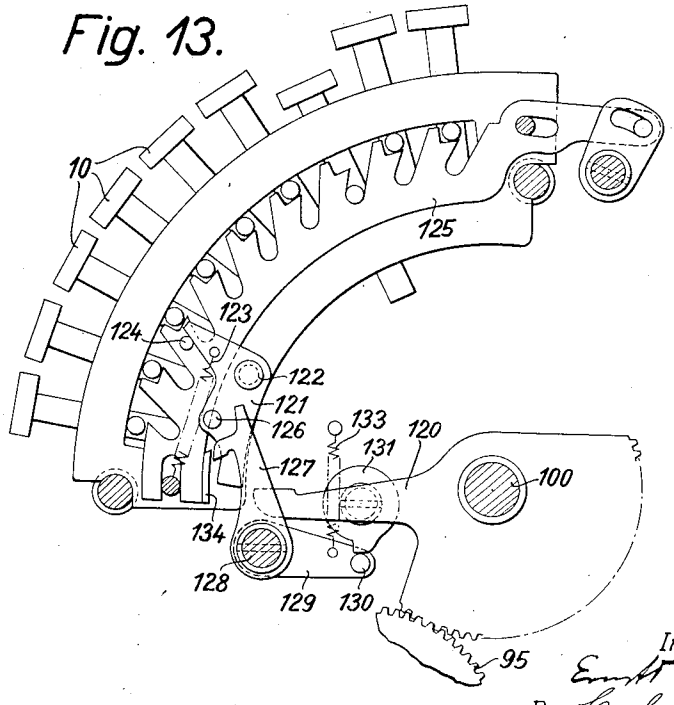


Fig. 13.



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May 10, 1938. E. BREITLING 2,116,779

CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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Fig. 14.

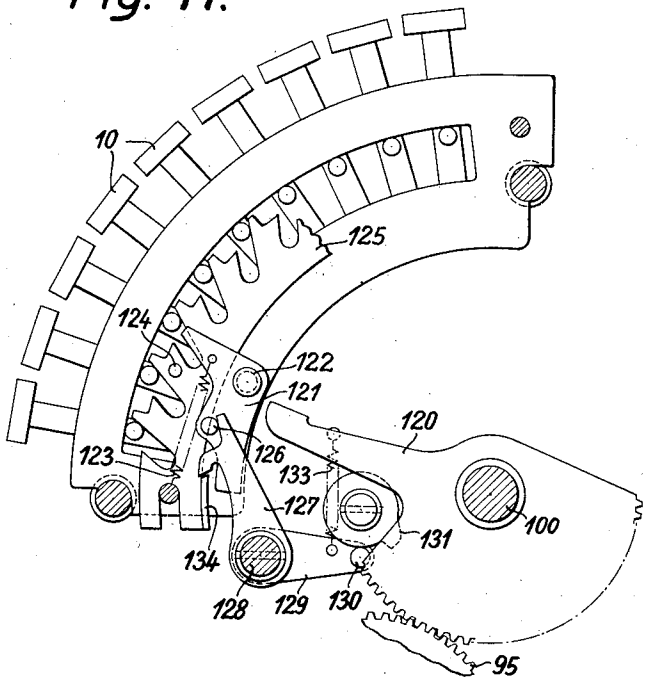
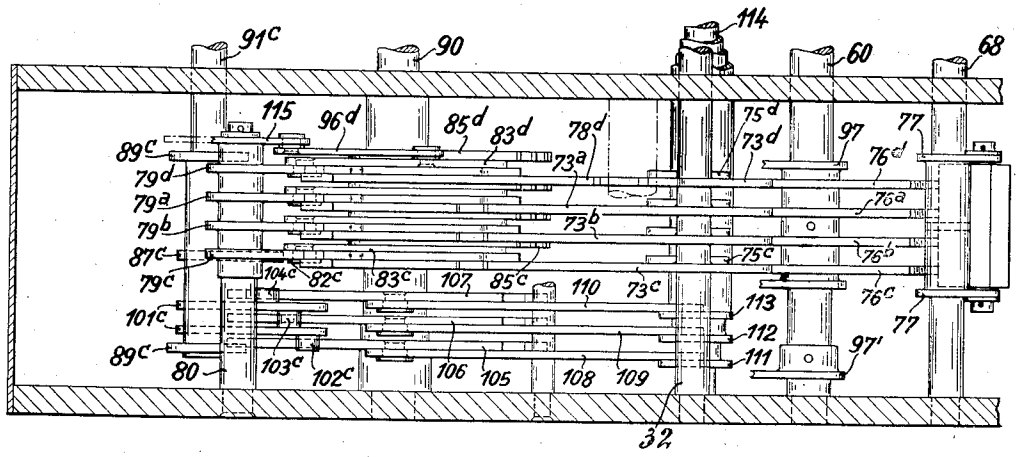


Fig. 17.



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CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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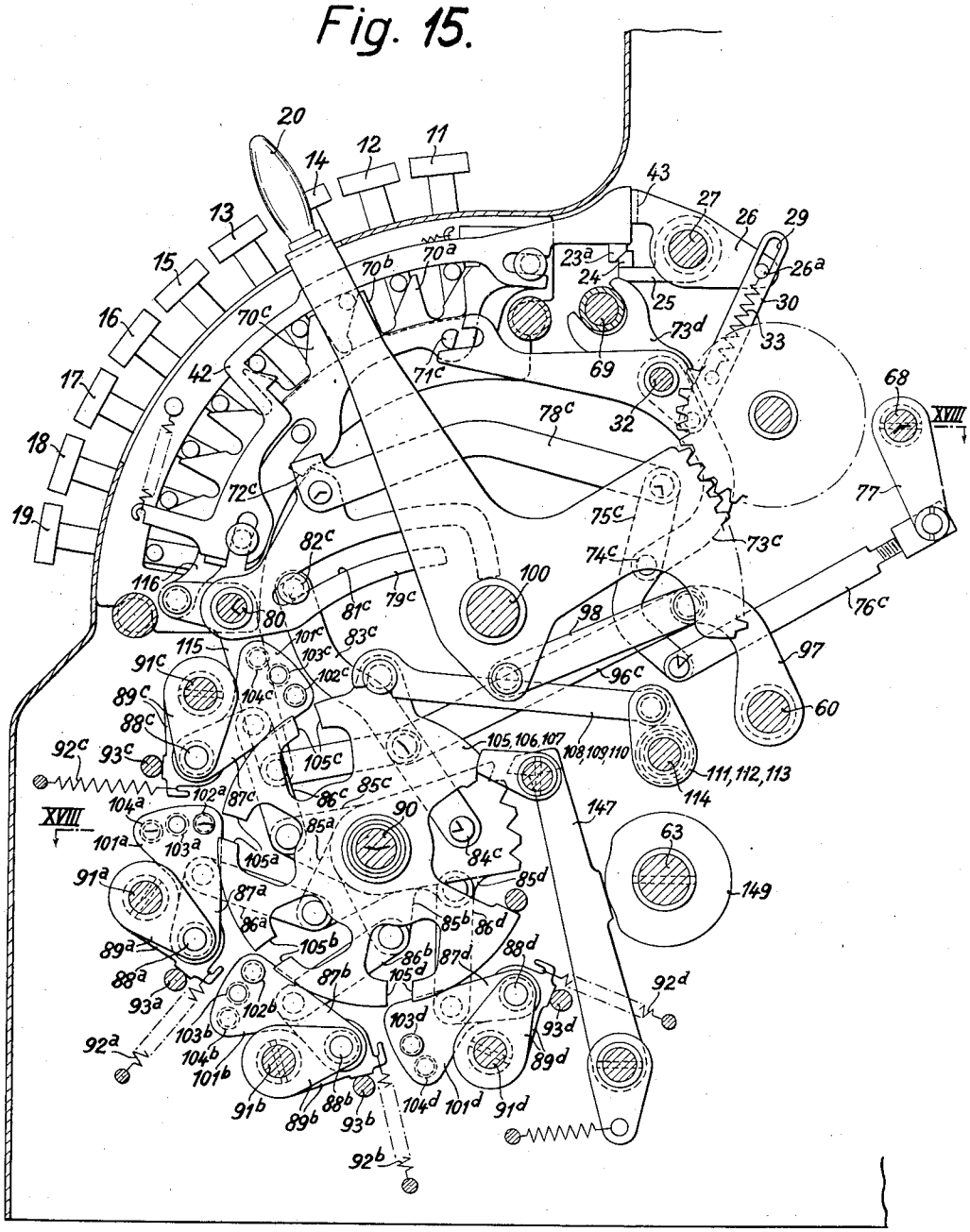
Fig. 15.



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CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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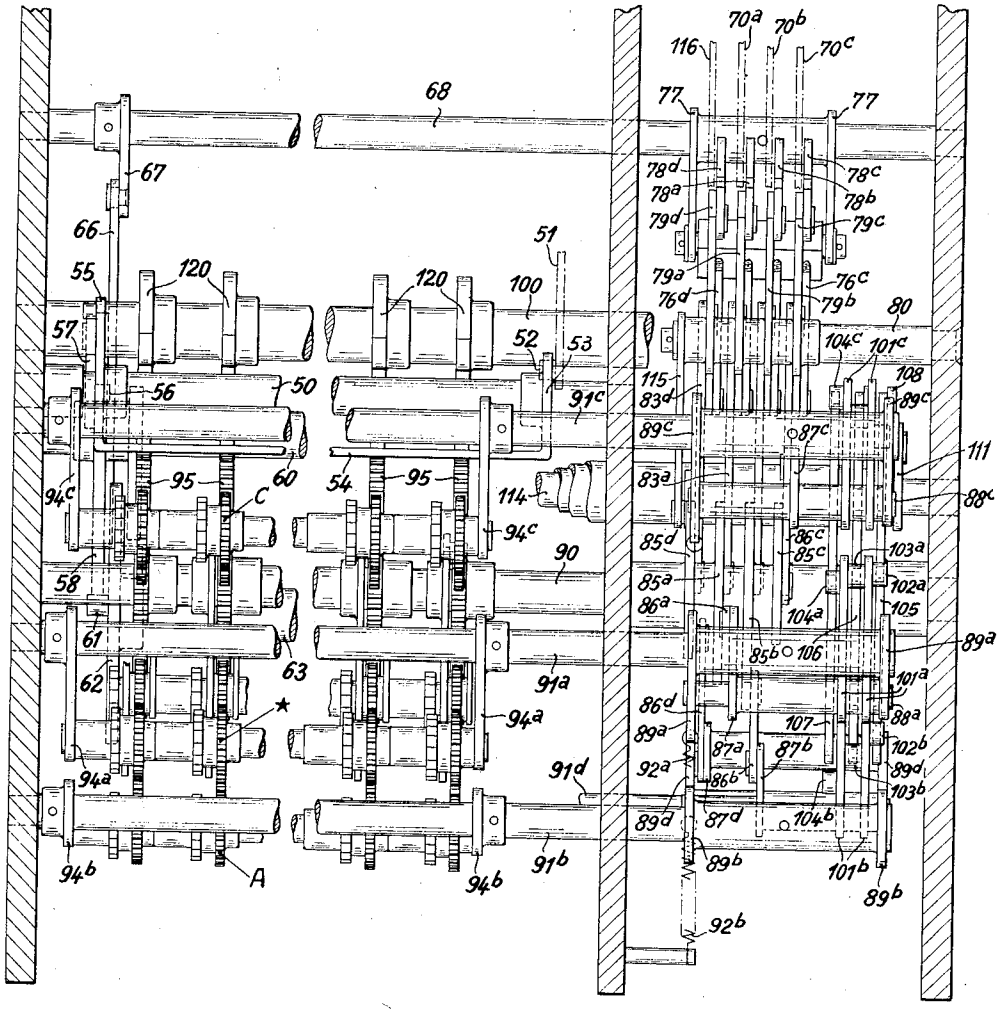
Fig. 16.



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CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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Fig. 18A.

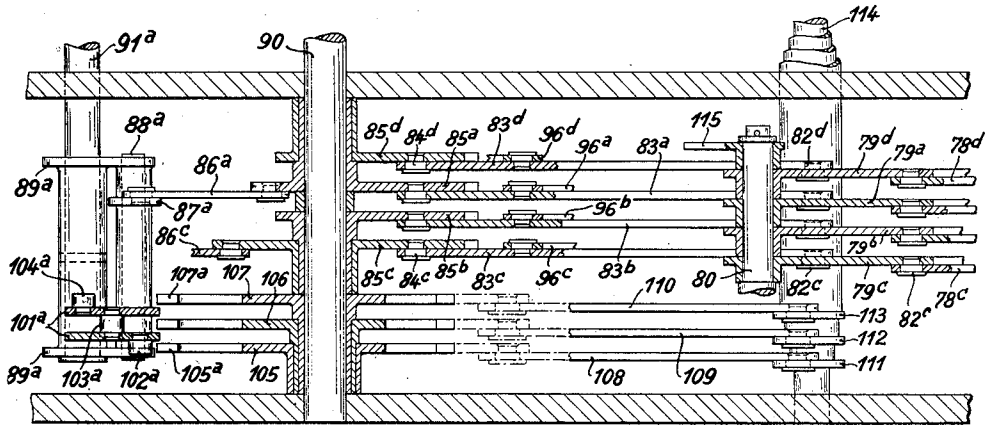
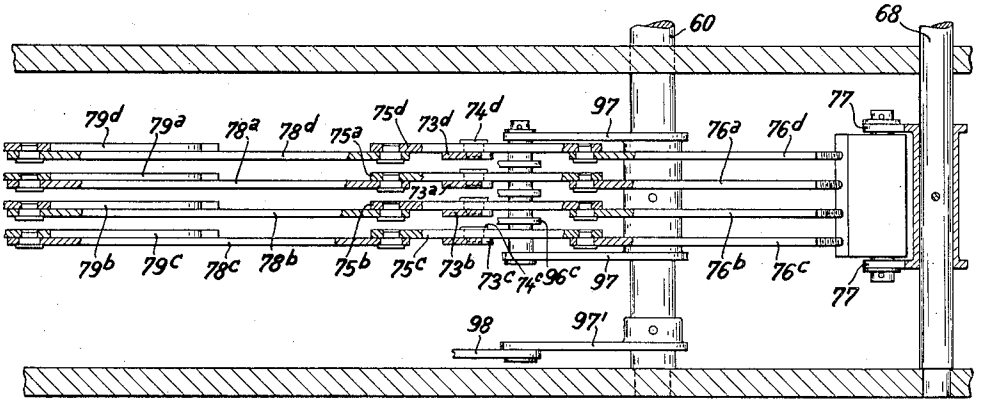


Fig. 18B.



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May 10, 1938. E. BREITLING 2,116,779

CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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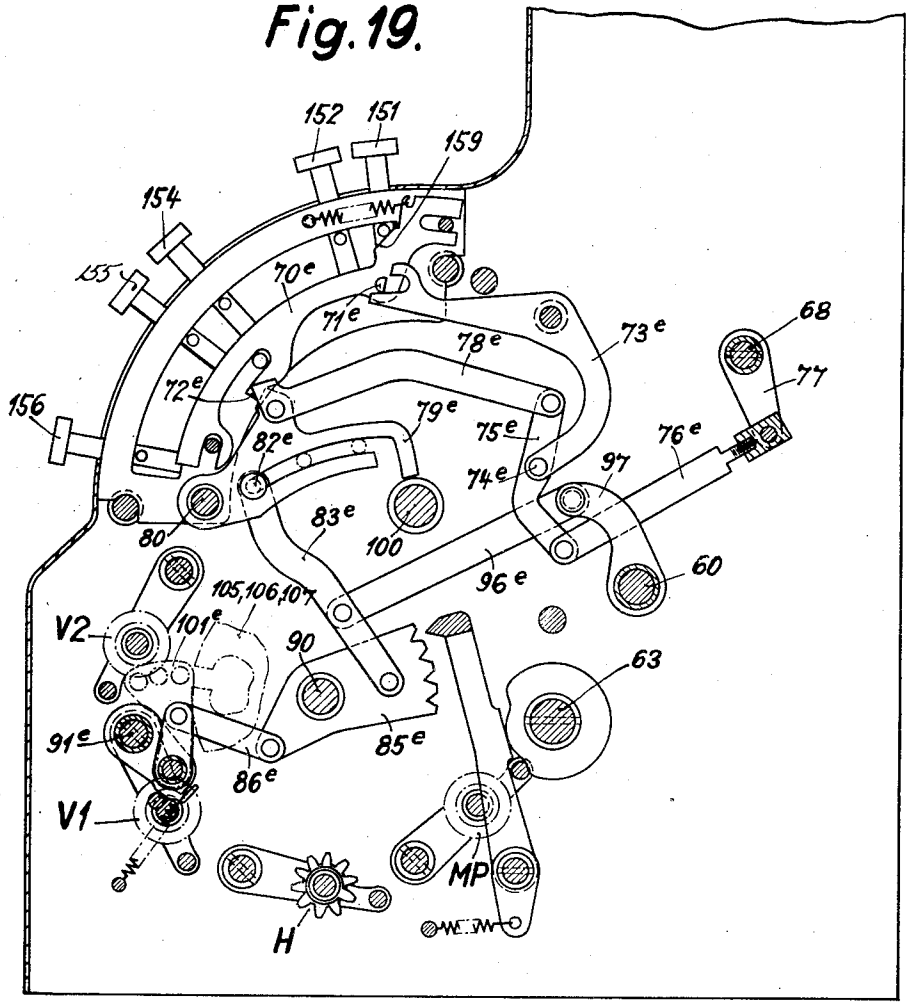
Fig. 19.



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CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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Fig. 20.

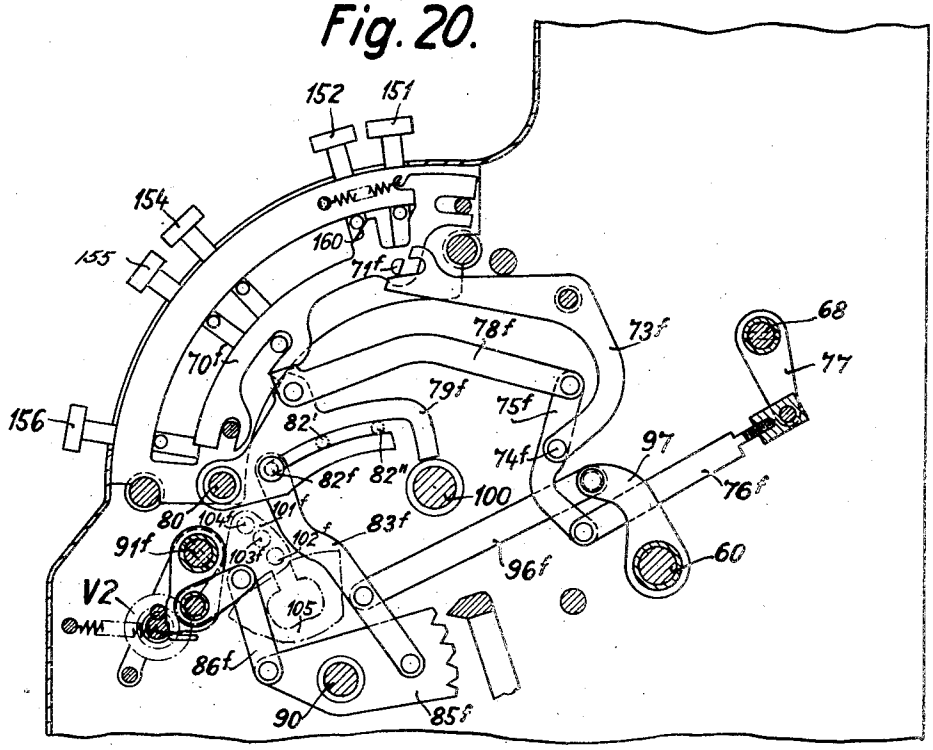
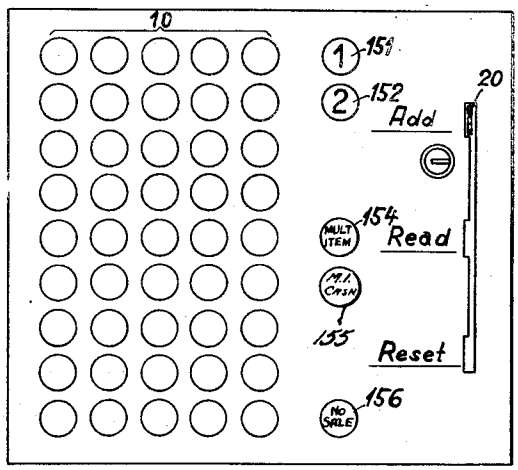


Fig. 23.



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CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

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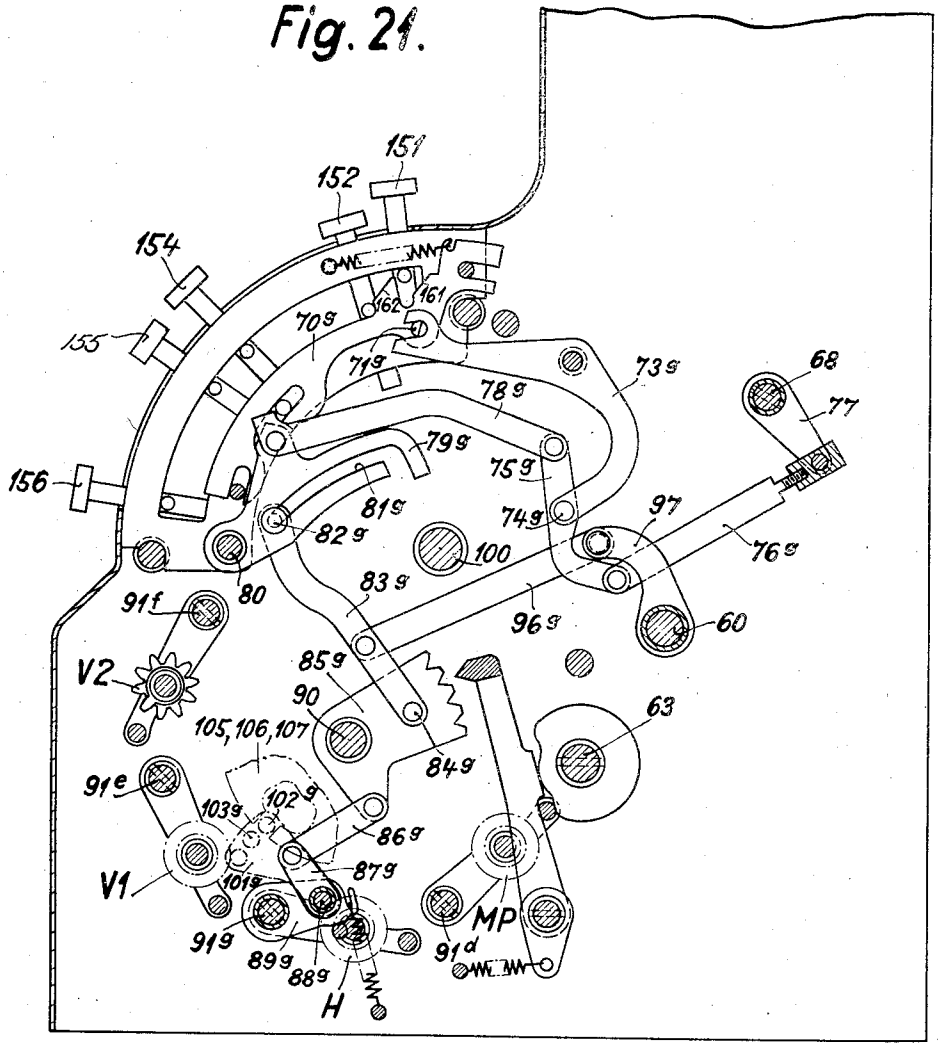
Fig. 21.



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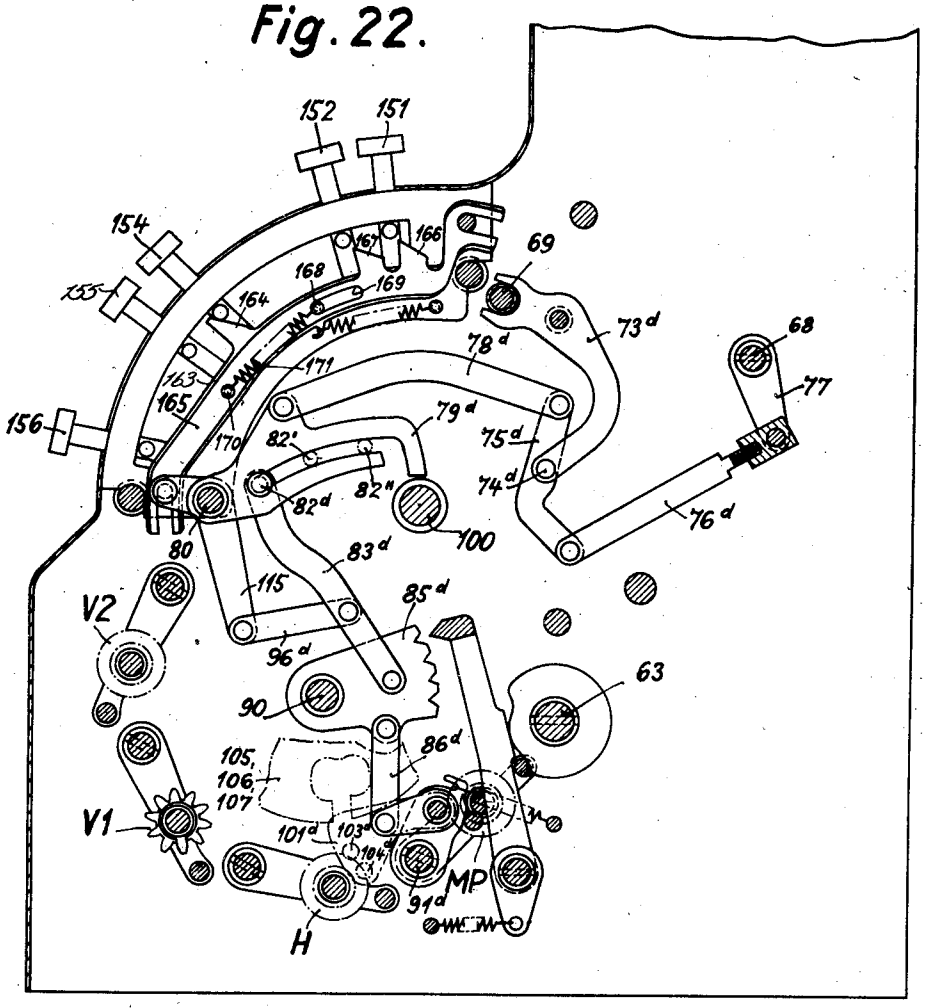
May 10, 1938. E. BREITLING 2,116,779

CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

Filed Dec. 18, 1934 18 Sheets-Sheet 17

Fig. 22.



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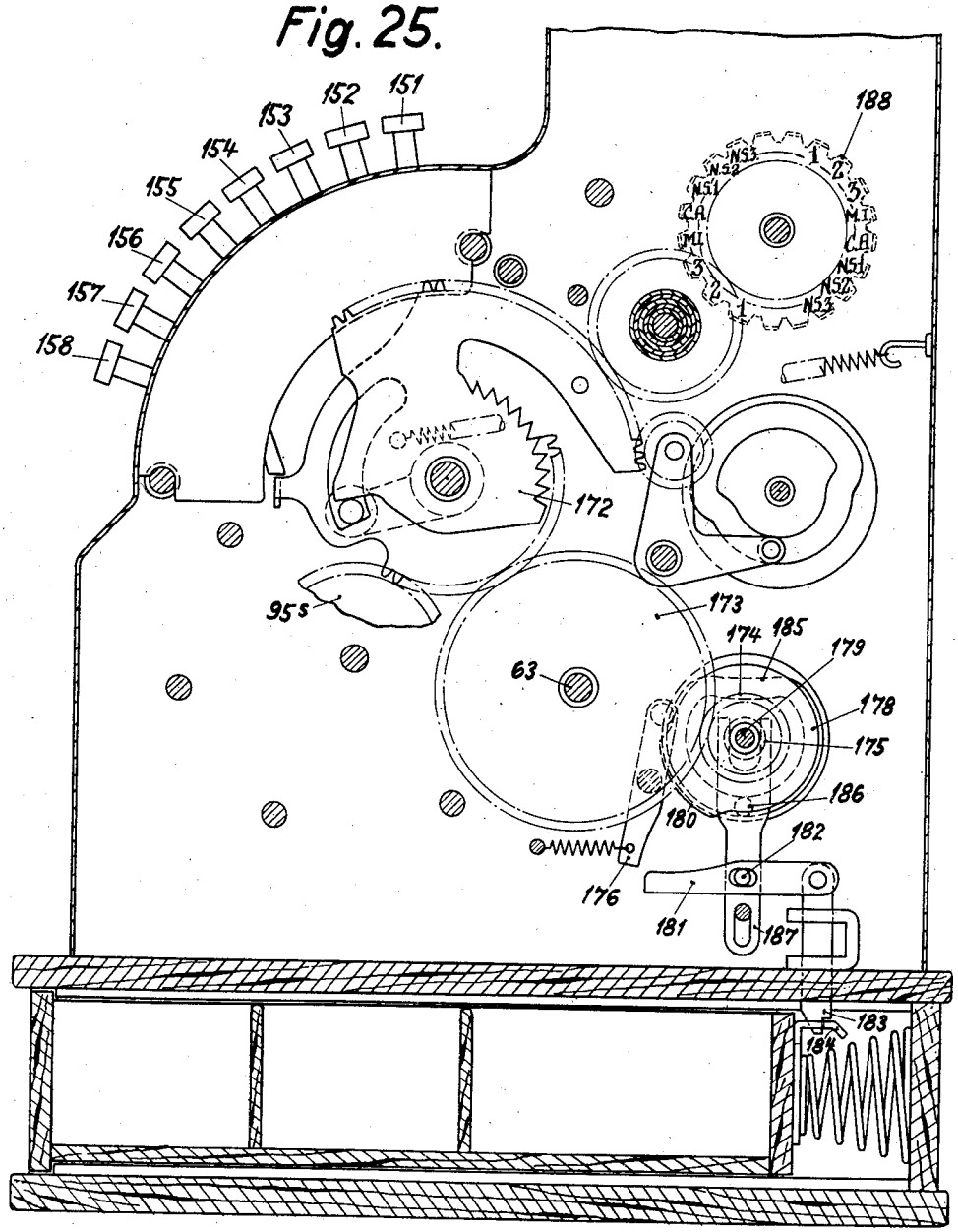
CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

Filed Dec. 18, 1934 18 Sheets-Sheet 18

Fig. 25.



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Patented May 10, 1938 2,116,779

UNITED STATES PATENT OFFICE

2,116,779

CASH REGISTER, ACCOUNTING, AND THE LIKE MACHINES

Ernst Breitling, Berlin, Germany, assignor to The National Cash Register Company, Dayton, Ohio, a corporation of Maryland

Application December 18, 1934, Serial No. 758,069
In Germany December 20, 1933

11 Claims. (Cl. 235—6)

This invention relates to cash registers, accounting machines and the like, and is more particularly directed to machines provided with a multiple item totalizer, from which multiple item totals can be taken, and a plurality of special totalizers from which subtotals and grand totals can be taken.

The main object of the invention is to classify the entries according to transactions, class of goods, clerks, accounts and the like, and more particularly the multiple-item-totals in multiple-item transactions.

Another object of the invention is to provide means for transferring the multiple-item-total from the multiple item totalizer to one or several totalizers.

Another object of the invention is to simplify the selection and control of engagement of the multiple item totalizer and the special totalizers for item entering and total taking.

Another object of the invention is to provide novel means for compelling the operator to take the total in multiple-item transactions after the entry of the last multiple-item, before any transaction of another kind can be entered.

Another object of the invention is to provide a novel arrangement of mechanism controlled by setting means adapted to condition the machine for multiple-item entering and for multiple-item total taking.

Another object of the invention is to reduce the number of setting means to be operated for the different modes of machine operations.

Another object of the invention is to enable the amount setting means to condition the machine for a certain mode of operations.

Another object of the invention is to enable certain of the machine conditioning means to release the machine for operation.

Further objects of the invention will be pointed out in the following detailed description with reference to the annexed drawings.

In the drawings one embodiment of the invention is shown by way of example (Figs. 1 to 18) in a machine adapted for the transactions "cash", "charge", "received on account", and "paid out", and provided with a multiple item totalizer, and appropriate transaction totalizers. The Figs. 19 to 22 show another embodiment in a machine provided with total taking account-(clerks) keys, whereas in the machine shown in Figs. 23 to 25 "no sale" keys are allotted to the sales persons.

Of said drawings:

Fig. 1 is a front view of key arrangement on the machine.

Figs. 2 to 6 are side views of the special key bank showing the various key detents, whereas Fig. 5 shows in addition also parts of the differential and printing mechanisms.

Fig. 7 is a side view of the special key bank and the machine release mechanism.

Figs. 8 to 11 are side views of the special key bank and the selecting device for each one of the totalizers in different positions.

Figs. 12 to 14 are side views of an amount key bank with the zero stop pawl in normal position and one amount key depressed, as well as shortly after a reset machine operation has been started.

Fig. 15 is a cross section of the device for controlling the selection of the totalizers.

Fig. 16 is a front view of the controlling means.

Fig. 17 is a top view of the controlling means.

Figs. 18A and 18B are sections through the controlling means along line XVIII—XVIII of Fig. 15.

Figs. 19 to 22 are side views of the special key bank and the device for selecting the totalizers and the control mechanism therefor according to the second embodiment.

Figs. 23 and 24 illustrate the key boards of machines provided with "no sale" keys for the sales persons.

Fig. 25 is a side view of the parts cooperating with the key arrangement shown in Fig. 24.

General description

In general terms the invention relates to cash registers and accounting machines especially such adapted for registering single-amounts, multiple-item transactions, and the totals thereof. A special feature of such machines consists in that the multiple-items of a purchase are accumulated on a multiple item totalizer and in order to finish the multiple-item registration, the total of the multiple-items must be taken. Although a single-item purchase can be regarded as a multiple-item registration with only one item, these so-called single amounts are registered without using the multiple-item totalizer. In order to prevent single item transactions from becoming confused with multiple item transactions, a novel means is provided to make it necessary to complete the entry of the multiple item transaction by taking a total thereof, before any other kind of transaction can be started.

In addition to the multiple item totalizer a grand totalizer may be provided which accumulates the amounts of all the sales transactions and indicates the total turn over of the department in which the machine is installed. The single-

item transactions are entered directly into this grand totalizer. The total of the items of the multiple-item purchases can be entered in the same way, however, it may be desirable to enter into the grand totalizer only the total of the multiple-items, which can be effected by automatically transferring the multiple-item-total to the grand totalizer when the multiple item totalizer is set to zero. This mechanism is shown in the modified form of the invention (Figs. 19 to 22).

In many cases it is desired to subdivide the amounts transferred to the grand totalizer into different groups or classes. This classification is made mainly according to business transactions (cash, charge, paid out and received on account), kinds of goods, or sales persons. Instead of the grand totalizer, or in addition to the grand totalizer, a plurality of special totalizers corresponding to the classification selected, are provided, which special totalizers have accumulated thereon the totals of different registrations, that is, the single-item and multiple-item transactions.

Interlocking means are arranged between the setting means for facilitating the operation of the machine. The special setting means for the multiple-item transactions (such as keys **16** to **18** and **11** to **13** respectively), coact with means so that, by depressing them, the mode of operation "zeroizing the itemizer" is directly determined, and simultaneously the release of the machine is effected, so that for taking a multiple-item-total one single key only has to be depressed.

According to the invention, the mode of operation control device operated in taking a multiple-item total, by a multiple-item total key, is of such a structure that a coupling means connected with the multiple item totalizer, at a multiple-item transaction, is coupled, upon depressing the multiple-item key and a special key, with an engaging means for the "adding" action, and, when a multiple-item total is to be taken, with an engaging means for the mode of operation "zeroizing" upon depression of a multiple-item total key. The coupling of the remaining totalizers with the one or the other engaging means for the different modes of operation is prepared by displacing the mode of operation lever and completed by depressing one of the special keys.

If the special keys serve as release keys, the special key operated at a multiple-item purchase is not to remain depressed during all of the machine operations pertaining to the said purchase, but has to be released at the end of each amount entered. Since, however, when a multiple-item is to be entered, only sales of the same kind, or by the same clerk, are to be itemized, an interlocking means provided between the special keys, enforces the use of one special totalizer for all entries of one multiple-item transaction when once started, because only one special key is free.

To have the "no sale" (change giving) keys function also as release keys which effect opening the cash drawer and, as the case may be, the print of "0.00", is of advantage with machines operated by a plurality of clerks. In this case a plurality of "no sale" keys corresponding in number to the subdivision of the clerk keys, is provided by means of which the machine can be released for opening the cash drawer. This subdivision as per clerks similar to the one of the multiple-item total keys serves the purpose that each time the drawer is opened, the initial of the respective clerk is printed and can therefore be checked later on.

The two functions, the release of the machine, and the selection of the totalizers, are effected by a spring, and the mechanism for performing these functions is tripped by the respective special key operated, and both are correlated to one another in such a way that the machine is not released when the movement of the totalizer selecting mechanism is hampered in any way.

When taking a multiple-item-total the mode of operation lever commonly provided for total taking, is not moved but remains in normal position (amount entering). The functions indispensable for the operation of "total taking" (for example, removing the zero stop pawls for the amount differential members) are not dependent on this lever in the present invention. Instead of controlling the removal of the zero stop pawls by the mode of operation lever, the machine normally tends to remove all zero stop pawls, but depression of any amount key disables the mechanism for so doing.

Due to the arrangement of the special keys and total keys to serve as motor release keys too, it is not necessary to provide for a special motor key bank, and since all these keys and the multiple-item key are arranged within one key bank, the length of the machine is reduced to a very handy extent. The various functions (totalizer selection, mode of operation selection, machine release) are effected by a relatively small number of setting means. Thus the number of manipulations required to operate the machine, is reduced as far as possible, whereas by means of the key interlocking means the correct handling of the setting means for the various machine operations is enforced.

Detailed specification

The key board (Fig. 1) of this machine consists of a plurality of rows of amount keys **10**, a bank of special keys **11** to **19** and a mode of operation lever **20**. The special keys **11** to **14** are allotted, f. i., to the transactions "cash", "received on account", "paid out" and "charge", of which keys that numbered **11** and **12** are coordinated to a common totalizer, whereas the keys **13** and **14** operate one special totalizer each which upon depressing one of these keys, is selected in a manner to be described later on, and into which the amount set up each time is entered. The key **15** is depressed for entering multiple-items and selects thereat a totalizer (itemizer) in which the contingent items of a multiple-item transaction are itemized (multiple-item-total). In order to take the total from the multiple-item totalizer one of the total taking keys **16**, **17**, or **18** is depressed depending on whether a multiple-item-total of several cash sales, of several bills paid, or of several sales on charge occurs. Key **19** is a "no sale" key. The mode of operation lever to be moved into the positions "add", "read" and "reset" conditions the machine for "total taking", so far as this is not done by operating the multiple-item-total keys **16** to **18**.

A plurality of key interlockings are provided to the effect that the correct operation of the machine during the different modes of machine operations is enforced. If a purchase comprises a plurality of items, only items of the same kind can be accumulated to form a multiple-item-total, f. i., only cash sales, or only sales on charge, or only bills paid, however, not items of different transactions. There is practically no need for

itemizing several items of money paid out. In the special key bank, besides the known detent **28** (Fig. 5) for holding the keys in depressed position, there are also arranged (Figs. 2, 3 and 4) three key detents **21**, **22**, and **23** each one having an oblique surface and a plurality of locking surfaces, which cooperate with the pins of the keys **11**, **12**, **13** and **14** as it will be described later on. By depressing key **11** the detent **21** is moved upward, whereby the other keys **12**, **13** and **14** are locked. In the same manner the keys **11**, **13** and **14** are locked by means of the detent **22** upon depressing the key **12**, whereas the keys **11**, **12** and **14** are locked by means of the detent **23** upon depressing the key **13**. The upper ends of the three detents **21**, **22**, **23** have a hook projection **21***a*, **22***a*, **23***a* which, when the slide moves upward, engages from behind the projection **24** of an arm **25**. The arm **25** is loosely mounted on an axis **27** and rigidly connected with a second arm **26** (Fig. 5), the pin **26***a* of which engages the slot **29** of a link **30**. The link **30** is linked to an arm **31** mounted upon a shaft **32**. The spring **33** stretched between the link **30** and the arm **26** holds normally the pin **26***a* in engagement with the lower wall of the slot **29** whereby the arm **25** is yieldingly held so that the projection **24** lies before the hooks **21***a*, **22***a*, **23***a* of the three key detents. When by depressing one of the three keys **11**, **12** or **13**, the pertaining slide **21**, **22**, or **23** is moved upward, the springs **33** and the slot **29** permit the arm **25**, **26** to give way in counterclockwise direction, until the hook projection is positioned behind the projection **24** whereby the respective detent is held in its upper position. In order to release the detent from the projection **24**, the machine drive is so constructed that the shaft **32** is given a short rocking movement in counterclockwise direction and back again, whereby the lever **25**, **26** is rocked a short distance in counterclockwise direction and the projection **24** frees the respective detent. The shaft **32** is driven during each machine operation; the rocking movement of the lever **31**, however, does not take place during each machine operation. When entering the items of a multiple item transaction, the lever **31** is not moved, which, however, is necessary at the end of each machine operation for entering a single amount, for taking a multiple-item-total and a grand total. For this purpose, the lever **31** and the shaft **32** are yieldingly connected, so that in case of need the lever **31** can be arrested. For this event, the slide **116** (Figs. 5 and 11) is provided, the upper formed end of which is so positioned, that, when the multiple-item key **15** is depressed, it reaches the stud **34** (Fig. 5) of the other end of the lever **31**. The counterclockwise movement transmitted at the end of such a machine operation to the shaft **32**, tensions the spring **34***a* without affecting the lever **31** and the parts connected therewith. As mentioned already, this occurs in entering multiple-items. Due to this also the detent **21**, **22**, or **23** moved upward is not released at the end of a multiple-item entry operation, whereas the totalizer keys **11**, **12**, or **13**, each serving as a motor release key, is released by detent **28**. As the one detent remaining in a working position, locks the other transaction keys, the next multiple-item can be entered only by using the same transaction key. By depressing one of the special setting means, depressing another setting means is prevented for all machine operations, pertaining to the series of entries of the multiple-item purchase under consideration. The special setting means are free to be operated only after the detent displaced by the special setting means is restored to normal position which is effected during the total taking operation following the amount entering operation.

For each classification (transactions, articles or clerks) a key is provided for multiple-item-total taking which controls the setting of a type carrier to print a character to identify the class of transaction entered. To this effect, the differential device **120***s* associated with the special key bank, is connected by means of the setting members **95***s* and a train of gears (Fig. 5), not lettered in the drawings, with a special type wheel **35** provided with the classification and total signs in the positions corresponding to the multiple-item keys. There is arranged the key **16** for the "cash" sales, the key **17** for amounts "received on account" and the key **18** for sales on "charge".

In order to enforce the depression of the multiple item total cash key **16** after the entering of a plurality of items constituting a cash sale, the detent **21** is provided with two locking projections **36** and **37** (Fig. 2), which when the cash key **11** is depressed, pass beneath the pins of the keys **17** and **18**, and—since the detent **21** remains in its upper position until the multiple-item-total has been taken—locks them until this detent, after the multiple item total has been taken, is restored to normal position. Owing to this, after a plurality of cash items of a single transaction have been entered, only the multiple-item-total key **16** for cash sales can be depressed, whereby the multiple-item-total when being printed upon the record materials is identified as a total, and is classified too. In the same way the detents **22** and **23** are provided with two locking projections **38**, **39** and **40**, **41** respectively (Figs. 3 and 4) which in itemizing operations lock the multiple-item-total keys **16** and **18** for multiple item cash sales and multiple item charge sales and, during the taking of the total of the multiple item charge sales the multiple-item-total keys **16** and **17** for cash sales and bills paid are locked out, so that after multiple-items of a certain kind are entered, only the appropriate multiple-item-total key can be depressed.

The multiple-item entry key **15**, which does not serve as a motor release key, and which has to be depressed at the beginning of a multiple-item registration, is held by a locking detent **42** in depressed position (Fig. 5). The locking detent **42** is not connected with the normal key release mechanism but its upper end contacts an extension **43** of the arm **26** which, as mentioned above, is not moved when entering multiple-items, so that the multiple-item key **15** is released only after the multiple-item total is taken.

When, after the "multiple item key" **15** is depressed, a key **11**, **12**, or **13** is depressed to release the machine for operation, the respective detent **21**, **22**, or **23** is rocked upwardly, thus rocking the arms **25** and **26** slightly counter-clockwise. This movement of the arm **26** gives the detent **42** a slight movement, but the detent is not moved far enough to release the key **15**.

A slide **45** (Fig. 6) arranged on the special key bank, is provided with three locking extensions **46** which normally lie beneath the pins of the multiple-item-total keys **16**, **17**, **18** and lock them. The slide **45** has an oblique surface **47** co-operating with the pin of the multiple-item key **15** in such a way that, by depressing this key, the slide **45** is moved upward. Thereby the keys **16**, **17** and **18** are freed from the locking surfaces **46**,

only after the multiple-item key 15 is depressed. Therefore, the multiple item total taking keys 16, 17, and 18 can be depressed only after the multiple item key 15 has been depressed. The slide 45 is also provided with a locking surface 48 preventing the no sale key 19 from being operated when the multiple-item key 15 is depressed.

If one of the single item transaction keys 11, 12, 13 or 14 is depressed for entering a single item, the multiple-item key 15 cannot be depressed because a detent 51 (Fig. 7) provided in its special key bank, is arranged in such a way that it is moved downward upon depression of one of the keys 11—14 and 16—18 thereby locking the other keys of this bank including also the multiple-item key 15.

Further, the keys of the special key bank, except the multiple-item key 15, serve as release and motor keys respectively and actuate for this purpose the following device:

A pin 52 fixed to the lower end of the detent 51 engages the slot of an arm 53 mounted on an axis 50 and connected by a bridge 54 with the arm 55 also mounted on the axis 50. The arm 55 under the action of a spring engages a square pin 56 of a rod 57 guided by the axis 50 and having its other end linked to the one arm of a four-armed lever 58. A strong spring 59 fixed to the lever 58 tends to rotate the lever 58 clockwise which, however, is normally prevented therefrom by a square pin 56 in front of the extension of the arm 55. The lower arm of the lever 58 engages in this position the flat stop pin 61 of a disk 62 fixed on the drive shaft 63 clockwisely rotated by means of the hand crank or the motor. However, as long as the release lever 58 is positioned in front of the stop pin 61, this rotation is not possible. Only if by depressing one of the release keys the lever 55 releases the square pin 56, the spring 59 can rock the release lever in such a way that the machine drive is released and when an electric drive is provided, the electric circuit is closed.

After the machine is released for operation, the machine drive tends to carry along the amount setting members 120 (Fig. 12) in clockwise direction till they abut against the feet of the amount keys depressed. The amount setting members 120 are held in their zero position by means of zero stop pawls 121 pivoted on pins 122 of the amount key banks. Under the action of springs 123, the zero stop pawls 121 engage pins 124 fixed to detents 125 of the amount key banks. If an amount key 10 (Fig. 13) is depressed, the appropriate zero stop pawl 121 is rocked by means of the pin 124 and thereby the amount setting member 120 released. Each zero stop pawl has fixed thereto a pin 126 confronting a lever 127. All the levers 127 are fixed to a shaft 128 which carries also a lever 129 having the roller 130 engaging under the action of a spring 133, the circumference of a cam disk 131. The cam disk 131 is given, during each machine operation, a counterclockwise rotation, whereby it, due to its shape, releases immediately at the start of a machine operation the lever 129 to be actuated by the spring 133, and restores said lever only at the end of the machine operation.

Each detent 125 has a flange 134 (Fig. 12) which when the amount key is depressed, is positioned in front of the appropriate lever 127. If at the beginning of an amount entering action the cam disk 131 releases the lever 129, the shaft 128 and the levers 127 fixed thereon cannot be actuated by the spring 133, since at least one of the levers 127 strikes the appropriate flange 134. Therefore, the levers 127 are not able to remove the zero stop pawls in those amount key banks in which no key is depressed.

If, however, no amount key at all is depressed, as it is the case in total taking machine operations, no one of the flanges 134 is in front of one of the levers 127, and the shaft 128 is able to rock counterclockwise immediately at the start of a machine operation, when the cam disk 131 releases the lever 129. Thereat all the levers 127 press upon the pins 126 and remove thereby all the zero stop pawls. This novel means of moving the zero stop pawls distinguishes from the prior art, in that, in machines heretofore known, the zero stop pawls were displaced for total taking operations by the manipulation of a total lever. However, in the present invention the levers 127 perform this function for taking totals of multiple item transactions. Therefore in the present invention the total lever 20 is not moved to the total taking position for taking a total of multiple item transactions, but is so moved for all other total taking operations.

The rearward extending arm of the release lever 58 (Fig. 7) has arranged thereon a link 66 connected with an arm mounted on the axis 68. Upon depression of one of the release keys this axis is rotated by a certain angle by means of the spring 59 which movement is utilized to engage the selected totalizer with the engaging mechanism (disks 105 to 107) common to all the totalizers. As set forth already, by depressing one of the keys 11 to 14 and 16 to 19 the machine is released. By combining the movement necessary for releasing the machine, with the control movements of other parts of the machine susceptible of being easily damaged, especially with the preparatory totalizer movement now to be initiated, it results that if the selection and the engagement of the totalizers is disturbed in any way, the machine can not be released and operated.

The machine is provided with three special totalizers (Fig. 11), viz.: a totalizer for the single amounts and multiple-items of "cash sales" and "received on account", a totalizer for all sales on "charge", a totalizer for all amounts "paid out", and a multiple-item totalizer, each being mounted on a special shaft. For the selection of the totalizer proper the device set forth hereinafter is provided:—

The special key bank has mounted thereon three detents 70*a*, 70*b* and 70*c* (Figs. 8, 9, 10) which are alike except the fact that their oblique surfaces are differently positioned. The slide 70*a* has two oblique surfaces coordinated with the keys 11 and 12 whereas the oblique surface of the slide 70*b* is coordinated with the key 14, and that of the slide 70*c* with key 13. Each of these three detents has fixed thereto a pin 71*a*, 71*b*, 71*c* and a stop surface 72*a*, 72*b*, 72*c*. The pins 71*a*, 71*b*, 71*c* are confronted by the fork-shaped recess of a lever 73*a*, 73*b*, 73*c* (Fig. 8) loosely mounted on a stud 32 and serving as clearance for studs 71*a*, 71*b*, and 71*c* during a machine operation in case none of the keys 11 to 14 is depressed. A fourth lever 73*d* is also mounted on the axis 32 (Fig. 11) the upper forked end of which, however, embraces an axis 69 so that it cannot be rocked. The lower end of each one of the arms 73*a* to 73*d* has fixed thereto a pin 74*a*—74*d* serving as pivots for each one of the levers 75*a*—75*d*. The levers 75*a*—75*d* are connected by means of links 76*a*—76*d* with

an arm 77 fixed to the axis 68, whereas the other ends of the levers 75a—75d are connected by means of links 78a—78d with curved levers 79a—79d. The curved levers are rotatably mounted on a stud 80 and bear in their normal position shown, i. e., as long as one of the keys 11, 12, 13, 14, or 15 is not depressed, against the abutment surfaces 72a—72c of the detents 70a—70c, whereas the pins 71a—71c lie outside the forked recesses of the appropriate levers 73a—73c.

If one of the keys 11 to 14 is depressed, f. i., key 14, the corresponding detent is moved upward (Fig. 9), whereby the pin 71b is caused to enter the recess of the lever 73b thus locking this lever against rocking so that the movement initiated by the shaft 68 can not cause an idle run of this lever. At the same time the stop 72b releases the curved lever 79b and, since by depressing one of the release keys the machine is released, the axis 68 is rocked (in counterclockwise direction as per Figs. 8 and 9) as mentioned already. As the lever 73b is held arrested, the pin 74b becomes the pivot for the lever 75b so that by the movement of the axis 68 the curved lever 79b is rocked in counterclockwise direction. In the two other selection devices not operated during this action, the curved lever 79a and 79c respectively, are locked by the stop 72a and 72c respectively, and the lever 73a, and 73c respectively, are loosely rotatable about the axis 32 so that the movement transmitted from the axis 68, is taken up by the leverage 73a and 73d to 78a and 78c which levers run idly so that the levers 79a and 79c are not moved. The curved lever 79d, however, is, as its appropriate lever 73d is always held arrested, counterclockwisely rocked by one unit during each machine operation.

The curved lever 79a (Fig. 8) and, accordingly also the curved levers 79b, 79c and 79d (Figs. 9 to 11)—has a slot 81a engaged by a pin 82a of a pulling link 83a pivoted on a pin 84a. This pin is fixed to a locking segment 85a rotatably mounted on the axis 90 and connected by means of a link 86a with an arm 87a on the short axis 88a. The axis 88a is supported by two arms 89a mounted on a stud 91a. To one of the two arms 89a a spring 92a is fixed which pulls the arm towards a stationary stop 93a and disengages the "cash and received on account" totalizer carried by arms 94a (Fig. 11) mounted on the axis 91a, from the amount differential wheels 95. The amount differential wheels are given in the first portion of the machine operation a setting movement adequate the value of the key depressed, whereas in the second portion they are restored.

The three pulling links 83a—83c have pivoted thereto a link 96a—96c each linked to an arm 97 on the shaft 60. The axis 60 has mounted thereon a second arm 97' (Fig. 17) connected by means of a link 98 with the mode of operation lever 20 mounted on the shaft 100 (Figs. 15, 18). If the mode of operation lever is in the position "add" (Fig. 15), the pulling links 83a—83c (Figs. 8, 9, 10) are in the illustrated inner position, that means, they are nearest the pivot 80 of the lever 79. If the mode of operation lever is moved into the position "read" or "reset", the three pulling links 83a—83c are rocked to the right about their pivot by one and two angle units respectively, whereby the pins 82 are positioned at 82' and 82'' respectively (Fig. 10).

The linkage lettered "a" serves for selecting the totalizer having accumulated thereon cash amounts and amounts received on account; the letter "b" indicates the connection with the totalizer for amounts paid out, and "c" the connection with the charge totalizer (Fig. 11). If the subtotal or total is to be taken from one of these totalizers the respective link 83a, 83b, or 83c has to be set into its proper position by means of the mode of operation lever.

The multiple item totalizer (Fig. 11), however, is not controlled by the mode of operation lever 20; it is controlled only by the setting means classifying the multiple-item transactions, especially by the keys 16–18, classifying the multiple-item-totals as per transactions. Therefore, the pulling link 83d associated with this totalizer, is connected with a link 96d linked in its turn to an angular lever 115 but not with the mode of operation lever, said lever 115 being rotatably arranged on the axis 80 and linked to the key bank detent 116. This detent 116 has such oblique surfaces that upon depression of the multiple-item key 15 it is moved downward by one unit, and upon depression of one of the multiple-item total keys 16, 17, 18 by two units. Accordingly, the pulling rod 83d is displaced through the angular lever 115 and the link 96d in such a way that the pin 82d upon depressing the listing key 15 (or multiple-item key) is positioned at 82', and upon depressing one of the multiple-item-total keys 16, 17, 18 at 82'', whereat, contrary to the other pulling links, the position marked (') is the adding, and the position ('') the total taking position. When this pulling link is in the position 82d, the multiple item totalizer is not engaged. This position is necessary because the lever 73d for this totalizer, contrary to the other levers 73a—73c is not able to rock.

Rigidly connected with the arm 87a (and also with the arms 87b, 87c and 87d, Figs. 8 to 11), the last member of the selecting mechanism operated by the release key, is a coupling member 101a, (101b, 101c, 101d) taking part in the selecting movement and thereby being engaged with one of the three mode of operation disks 105, 106, 107 (Figs. 15, 18). For this purpose the coupling member 101a (101b—101d) has three coupling pins 102a, 103a, 104a (and accordingly 102b, c, d; 103b, c, d; 104b, c, d) arranged concentrically to the axis 88a (88b, 88c, 88d) and having their working surfaces lying in three different planes, i. e., in the planes of the mode of operation disks 105, 106 and 107. To arrange the middle coupling pin 103a (103b, c, d) the coupling member is divided into two arms covering each other when viewed from the side, which are held together at the same time by the stud 103a, and carry sidewardly extending studs 102a and 104a respectively. The disks 105–107 for actions "adding", "read", and "reset", engaging inter alia the selected totalizers at proper times, are rotatably mounted on the axis 90 and by means of pulling links 108, 109, 110 connected with an actuating arm 111, 112 and 113 respectively. The arms 111, 112, 113 rotatable about the axis 114, are moved to and fro (Fig. 15) during each machine operation by means of a driving device not shown.

If, in order to enter a single amount, one of the keys 11, 12, 13 or 14, for instance key 14, is depressed and the corresponding lever 79b is counter-clockwisely rocked (Fig. 9) by a certain degree, the coupling member 101b is rocked by one unit in clockwise direction through the locking segment 85b, the link 86b and the arm 87b. In so doing, the pin 102b of the coupling member 101b enters the notch 105b in the corresponding mode of operation disk 105 whereby the "paid out" to-

talizer A is selected to be engaged with the amount differentials. In the same manner—if the mode of operation lever is set to "add"—by depressing one of the keys 11 or 12, the coupling pin 102*a* of the cash totalizer would have been forced into the notch 105*a* of the disk 105 and by depressing the key 13 the coupling pin 102*c* of the charge totalizer into the notch 105*c* of the disk 105. As due to the rigid lever 73*d* the lever 79*d* is rocked during each machine operation, the coupling member 101*d*, if no key is depressed, is always clockwisely rocked by one unit. As, however, the multiple item totalizer should not be engaged during the entry of single item transactions, no pin 102*d* is provided. Therefore, even though the member 101*d* receives a one step movement when single item transactions are entered, the multiple item totalizer is not engaged, because no pin 102*d* is in position to be rocked into the notch 101*d* of the disk 105.

At the start of the machine operation the segments 85*a*—85*d* are locked in that the aliner 148 arranged on a lever 147, is engaged with the teeth of the segments 85*a*—85*d* by means of a cam disk 149.

By the clockwise movement of the arm 111 (Fig. 15) taking place between the setting and the restoring movement of the amount differentials, the disk 105 is clockwisely rocked by a certain degree. The coupling pin 102*a*, *b* or *c* is carried along, and thereby the corresponding axis 91*a*, *b* or *c* is so rocked that the totalizer carried by the arms 94 (*a*, *b* or *c*) on this axis is brought into engagement with the amount differential wheels 95 and, after the amount is transferred, disengaged again. The oscillating movements of the disks 106, 107 timed with their mode of operation are ineffective, since their notches which in the drawings are congruent with that of disk 105, are not engaged by coupling pins.

For entering multiple items, the multiple-item-key 15 is depressed, whereby by means of the detent 116 of the angular lever 115 and the link 96*d* the pulling link 83*d* is moved by one unit to the right (82') thus doubling the effective lever arm of the curved lever 79*d*. Therefore, when the curved lever 79*d* is rocked, which occurs when depressing one of the release keys always to the same extent, the coupling member 101*d* is clockwisely rocked by two units by means of the parts 83*d* to 87*d*. Thereby the coupling pin 103*d* lying in the plane of the disk 105, enters the notch 105*d* of this disk. Accordingly, the multiple-item totalizer MP is engaged by means of the disk 105 for adding. It should be noted that the coupling member 101*d* is slightly different from the members 101*a*, 101*b*, and 101*c*. This difference lies in the fact that the stud 103*d* is in the plane of the disk 106 as is the case with other coupling members 101*a*, 101*b*, and 101*c*. Thus the multiple item totalizer can be operated in only two different timings; that is, "add" timing by disk 105, and "reset" timing by disk 107.

If for taking a multiple-item total one of the keys 16, 17 or 18 is depressed, the pulling link 83*d* is moved due to the appropriate more inclined surfaces of the detent 116, by an additional unit to the right (82''), whereby the effective lever arm of the curved lever 79*d* is enlarged once again. Therefore, when the lever 79*d* is rocked, the coupling member 101*d* is rocked so far that its coupling pin 104*d* lying in the plane of the zeroizing disk 107, enters the notch 107*d*. The multiple item totalizer is coupled by means of the oscillating movement of this disk during the setting movement of the amount differentials with the latter and thereby set to zero (multiple-item-total).

Taking the total from the special totalizer is controlled by the mode of operation lever by the adjusting of which to "read" or "reset" the pulling links 83*a*—83*c* are displaced to the right by one and two units respectively. If by depressing one of the special keys 11 to 14 the proper curved lever 79*a*—79*c* is rocked, the coupling member 101*a*—101*c* of the totalizer to be selected, is clockwisely rocked by two and three units respectively, whereby either the pertaining coupling pin 103*a*—103*c* enters the opposite notch 106*a*—106*c* of the disk 106, or the corresponding coupling pin 104*a*—104*c* the opposite notch 107*a*—107*c* of the disk 107. The totalizer selected each time is thereby coupled at the times corresponding to the mode of operation set, with the amount differentials and, accordingly, either read or reset.

If it should happen by inaccurate setting of the mode of operation control means that the carrying notch of one of the mode of operation disks 105, 106, or 107 is not properly in the path of the pertaining coupling pins 102, 103, or 104, and thereby the selection of the totalizers hampered, the axis 68 is not able to rock. As this axis is connected with the release lever 58, the spring 59 is unable to rock the same and, therefore, the machine can not be released.

To summarize the operation of the above embodiment of the invention when entering a multiple-item transaction, the following operating is given:

The amount of an item is set up on the amount keys 10 (Fig. 1), then the multiple-item key 15 is depressed, followed by a depression of a transaction key 11, 12, or 13, which key releases the machine for operation. During the machine operation the amount of the item is entered into the multiple-item totalizer and into the selected "charge", "cash", or "received on account" totalizer. At the end of the machine operation the multiple-item key 15 remains depressed. Any number of items can be entered by setting up the items on the keys 10 and depressing the transaction key. After all the items have been entered, a key 16, 17, or 18 is depressed, which key releases the machine for operation and causes a total to be taken from the multiple-item totalizer. In this case the total lever 20 remains in its add position.

When entering single item transactions the operation is the same except that the multiple-item key is not depressed, and, therefore, the amount is added only into the "charge", "cash", or "received on account" totalizer. Totals are taken from these transaction totalizers by first moving the lever 20 into "read" or "reset" position and then releasing the machine by depressing the desired transaction key 11 to 14.

Modified form

A modified form of the invention is illustrated in Figs. 19 to 23 inclusive.

The embodiment shown in Figs. 19–22, is designed to be operated by clerks and has two clerks' totalizers V1, V2, a grand totalizer H, and a multiple item totalizer MP which as in the embodiment described hereinbefore, are arranged in a circle about the differentials 95 on the axis 90. Accordingly, the key board comprises amount keys 10, and two clerks' keys 151, 152. In the same key bank there are also arranged the corresponding "no sale" keys 156 and the multiple-

item key 154 necessary to engage the multiple item totalizer. Selecting the totalizers is effected in the same manner as in the first described embodiment. The shaft 68 actuated by depressing one of the release keys 151, 152 imparts its movement to four actuating devices which through the arm 77 of said shaft and the engaging elements 101*d*, *e*, *f*, *g* of the totalizers MP, V2, V1 and H engage, or not, the totalizers with the operation disks 105 (106 or 107 respectively), according to the mode of the preceding machine control. For this purpose four links 76*d*—*g* are provided connected with links 75*e*—75*g* having pivoted thereto idly running levers 73*e*, 73*f* and 73*g*, and thus form fix points at 74*e*, 74*f* and 74*g*. The lever 73*d* for the multiple item totalizer linkage is permanently kept arrested by means of the upper end of said lever embracing the shaft 69. Thus the link 75*d* is fulcrumed on the stud 74*d*, so that the link 78*d* and the lever 79*d* are always moved, however, in machine operations where no multiple-items are to be entered, only so far that the stud 103*b* serving for adding actions remains outside the reach of the mode of operation disks 105—107. As regards the other links 78*e*—78*g* and levers 79*e*—79*g*, the lockings 72*e*, 72*f*, and 72*g* effect the selection of another fulcrum for the links 75*e*—75*g* which fulcrum permits the levers 73*e*—*g* to rock freely. If the locking is disabled in a manner to be described hereinafter, also these levers 79*e*—79*g* are able to work and to move through their linkages (83*e*—87*g*) the studs 102*e*—*g* for adding actions within the coupling reach of the mode of operation disk 105, provided that one of the levers 83*e*, 83*f* or 83*g* respectively, are not positioned by the operation control means otherwise than shown in the drawings. Arresting the levers 73*e*, 73*f*, 73*g* is effected by the detents 70*e*—70*g*, the detents 70*e* and 70*f* having cam surfaces 159 and 160 respectively, facing the key 151 (V1) and the key 152 (V2) respectively, whereas the detent 70*g* has two oblique surfaces 161, 162 for the two keys 151, 152 which when the keys are depressed, arrest by means of the studs 71*e*, 71*f*, 71*g* the levers 73*e*, 73*f* and 73*g* respectively. The oblique surfaces 161, 162 cause the engagement of the grand totalizer H during each operation of the machine where clerks' keys are depressed. Its operation, therefore, is dependent, like the clerks' totalizers V1, V2, upon depression of a clerk's key.

If a single amount is to be entered, the proper clerk totalizer V1, or V2 and the grand totalizer H are selected by depressing the corresponding clerk key 151, 152 and the amount set up is accumulated thereon. The multiple item totalizer MP, however, is not selected, as its engaging member 101*d* does not have at the first point a stud for the mode of operation control. Its engagement is effected only by depressing the multiple-item key 154 affecting the oblique surface 164 of the pertaining detent 163 pressing the same downward by one unit, so that through the linkage 115 and 96*d* the arm 83*d* is moved into middle position (82'), in which the stud 103*d* cooperates with the adding disk 105. Thus the multiple item totalizer is selected in the following machine operation and operated. As the multiple-item key is held in depressed position (detent 42, Fig. 5) till the total is taken, the machine can only be operated for actions wherein the multiple item totalizer is used. When entering items of a multiple-item transaction, the key 155 is depressed to release the machine for operation. The last of these machine operations is taking the multiple-item-total of the itemizer MP which is effected in the present case by depressing a clerk's key 151, or 152, in the following manner:—

The detent 163 associated with the multiple-item key 154, is, for the purpose of being moved downward, positively connected with a second detent 165 having two extensions with oblique surfaces 166, 167, the said extensions being normally positioned as per Fig. 22. When the multiple-item key 154 is depressed, the detent 163 forces, by means of its pin 168 engaging the left hand end of the slot 169 in the detent 165, the latter by one unit downward, whereat the two oblique surfaces 166, 167 of the detent 165 are positioned beneath the pins of the keys 151, 152, so that when one of these keys is depressed, said detent is moved downward by an additional unit which movement transmitted to the lever 115, causes the arm 83*d* to be moved into the position (82'') in which when actuated the stud 104*d* cooperates with the "reset" disk 107. For the detent 163 it is not necessary to follow the additional movement of the detent 165, as its pin 168 is able to slide in the slot 169 whereat, however, the spring 171 stretched between the studs 168 and 170 of the detent, is tensioned. So long as the multiple-item key, for the purpose of itemizing, is held in depressed position, the two detents 163 and 165 could be rigidly connected with each other, that is, they could be integral.

When after the multiple-item key one of the keys 151 or 152 is depressed, the multiple-item totalizer is brought into engagement for the purpose of totalizing, its total is taken over by the differential members 95 which when restored, transfers it to the clerk's totalizer V1 or V2 which are also in operative connection with the clerk's keys, and the grand totalizer H, so that the total of the multiple-item transaction is accumulated during one operation of the machine on each of the said totalizers.

In the same manner as the multiple-item transactions are classified by means of setting means, it is, of course, of advantage to include in this classification also other registering operations of the machine. Particularly in machines adapted to be operated by a plurality of clerks, classifying the "no sale" operations as per clerks would be very advantageous. Therefore, in the key board of the machine as per Fig. 24, there are arranged besides the three clerk's keys 151–153 three "no sale" keys 156–158 constructed also to serve as release keys just as the clerk's keys do, so that the machine can be released without depressing a clerk's key. The keys cooperate with the common differential device 172 (Fig. 25) adjusting for each "no sale" key a clerk's initial NS1, NS2, NS3 on the type wheel 188 of the printing device. The differential member 172 is through the parts 173–176 in connection with the cam disk 178 mounted on the shaft 179 and being provided with a cam 180 common for all the three "no sale" keys—which cam, however, as it is easily understood, can be split up into three separated cams, each allotted to one of the "no sale" keys—said cam 180 positioning a lever under the action of a spring so that it clockwisely rotates a second lever 181 when automatically raised, about its pivot 182 and disables the locking mechanism for the drawer 183, 184. The lever 181 is raised by means of a stud 186 provided on the forked member 187, the stud 186 engaging the groove 185. For amount entering the lever 181 is in a well known manner actuated by a member operated only when

single amounts or multiple-item-totals are to be entered. In the two modified forms of the invention shown in Figs. 19 to 23, the multiple-item key is depressed to select the multiple-item totalizer, followed by the depression of key 155, which key releases the machine for operation and the various items are entered into the multiple-item totalizer only. At the end of the operation the key 154 remains depressed. When taking a total from the multiple-item totalizer, a clerk's key 151 or 152 is depressed, and the total taken from the multiple-item totalizer is transferred to the selected clerk's totalizer.

When entering single-item transactions, the desired clerk's key is depressed, without first depressing the multiple-item key 154. A total is taken from a clerk's totalizer by first adjusting the lever 20 to "read" or "reset" and then depressing the desired clerk's key 151 or 152.

The difference in operation between the first form of the invention, and the modified forms, is that in the first form the items of a multiple-item transaction are entered into both the multiple-item totalizer and into the transaction totalizer, and then the multiple-item totalizer is merely reset to zero. In the modified forms, the items are entered into the multiple-item totalizer, and then, when resetting the multiple item totalizer, the total is transferred to the selected clerk's totalizer.

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 embodiments herein disclosed, for it is susceptible of embodiment in various other forms all coming within the scope of the claims which follow.

What is claimed as new is:

1. In a machine of the class described, the combination with a multiple item totalizer and a plurality of special totalizers, of a multiple item control key, a plurality of special keys for selecting the special totalizers for entering single amounts and multiple-items, and of a plurality of multiple-item-total taking keys corresponding to the special keys.

2. In a machine of the class described, a multiple item totalizer, a multiple item key for selecting said totalizer for amount entering operations, a plurality of multiple-item-total taking keys for taking totals from said totalizer, means adapted to engage said totalizer for amount entering actions and zeroizing, a control member for coupling said totalizer with said engaging means, said member being adjustable to an adding and a zeroizing position, connecting means between said member and said multiple-item key adapted to position said member into its adding position, and other connecting means between said member and said total taking keys adapted to position said member into its zero position.

3. In a machine of the class described, a plurality of transaction totalizers, a multiple item totalizer, actuators for said totalizers, a plurality of keys for selecting the transaction totalizers, a multiple item key for selecting the multiple item totalizer, totalizer engaging means, means for coupling the transaction totalizers with the engaging means, means for coupling the multiple item totalizer with the engaging means, said coupling means including an element normally free to operate without coupling the totalizer with the engaging means, and locking means for said element, controlled by a selecting key for causing the coupling means to be coupled to the corresponding totalizer engaging means.

4. In a machine constructed to receive multiple item transactions, the combination of a multiple item totalizer, total taking mechanism, a total taking key, a control bar to select the multiple item totalizer, a control bar to release the machine for operation, both of said control bars operated by the total taking key, said mechanism being operated under the joint control of both of said bars.

5. In a machine constructed to receive multiple item transactions, the combination of a multiple item totalizer, total taking mechanism, a total taking key, a machine release mechanism released for operation by said total taking key, means to couple the totalizer with the total taking mechanism, and connections between the machine release mechanism and the coupling means to engage the coupling means with the total taking means simultaneously with the release of the machine.

6. In a machine of the class described, the combination of a totalizer, a machine release mechanism, a manipulative device, connections between manipulative device and the machine release mechanism to release the machine on operation of the device, connections between the totalizer and the release mechanism including an adjustable member, total taking mechanism, and means actuated by the manipulative device to adjust said member into a position wherein the release mechanism couples the totalizer with the total taking mechanism.

7. In a machine of the class described, the combination of a totalizer, actuators therefor, a normally restrained machine release mechanism, means to control the engagement of the totalizer with the actuator for total taking, means to couple the totalizer with the total taking control means, including an adjustable member, a manipulative device, and mechanism actuated by the operation of the manipulative device to simultaneously adjust the adjustable member and free the release mechanism whereby the connections couple the totalizer to the total taking control means.

8. In a machine of the class described, the combination of a totalizer, actuators therefor, a normally restrained machine release mechanism, means to control the engagement of the totalizer with the actuators for total taking, means to couple the totalizer with the total taking control means, including a pivoted lever having a slot and a link coacting with the slot, manipulative means, and connections between the manipulative means and the link to change the point of coaction between the lever and the link, connections between the manipulative device and the machine release mechanism to release the machine upon operation of the manipulative device, and connections between the release mechanism and the coupling mechanism whereby the totalizer is engaged with the total taking control means upon operation of the manipulative device.

9. In a machine of the class described, the combination of amount determining manipulative devices for setting up single amounts and items of a multiple item transaction, a multiple item totalizer, a plurality of classification totalizers, actuators controlled by the manipulative devices to enter said amounts and items into the totalizers, totalizer engaging means to engage selected totalizers with the actuators, setting means

to control the engaging means to engage the special totalizers when entering single items, manipulative means to control the engaging means to engage the multiple item totalizer with the actuators when entering items of a multiple item transaction, and means set by the last named manipulative means and operated by setting means, adapted to condition the machine to take a total from the multiple item totalizer for the purpose of adding the total to a selected classification totalizer when taking the total from the multiple item totalizer.

10. In a machine of the class described, the combination of a plurality of amount key banks, a plurality of special keys, a multiple item totalizer, a plurality of special totalizers selected by said special keys for receiving single amounts and multiple-item totals, a multiple-item key for selecting the multiple item totalizer, totalizer engaging means, a detent operated by said multiple-item key to condition the engaging means for adding multiple items on said multiple-item totalizer, means to maintain the multiple-item key and said detent in adjusted position until after a total taking operation, and a second detent associated with the special keys to readjust the totalizer engaging means for taking a total from the multiple-item totalizer.

11. In a machine of the class described, the combination of a multiple-item totalizer, actuators therefor, a multiple-item key for selecting said totalizer for item entries, a plurality of multiple-item total keys for taking totals from said totalizer, means to engage said totalizer with the actuators for item entries, means to engage said totalizer with the actuators for total taking operations, a member connected with the totalizer selectively coacting with said engaging means, means to adjust said member to coact with either of said engaging means, and a key detent connected with said adjusting means and having a plurality of oblique surfaces coacting with said keys when the keys are depressed for controlling the positioning of said members to selectively coact with said engaging means.

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