

May 28, 1929.

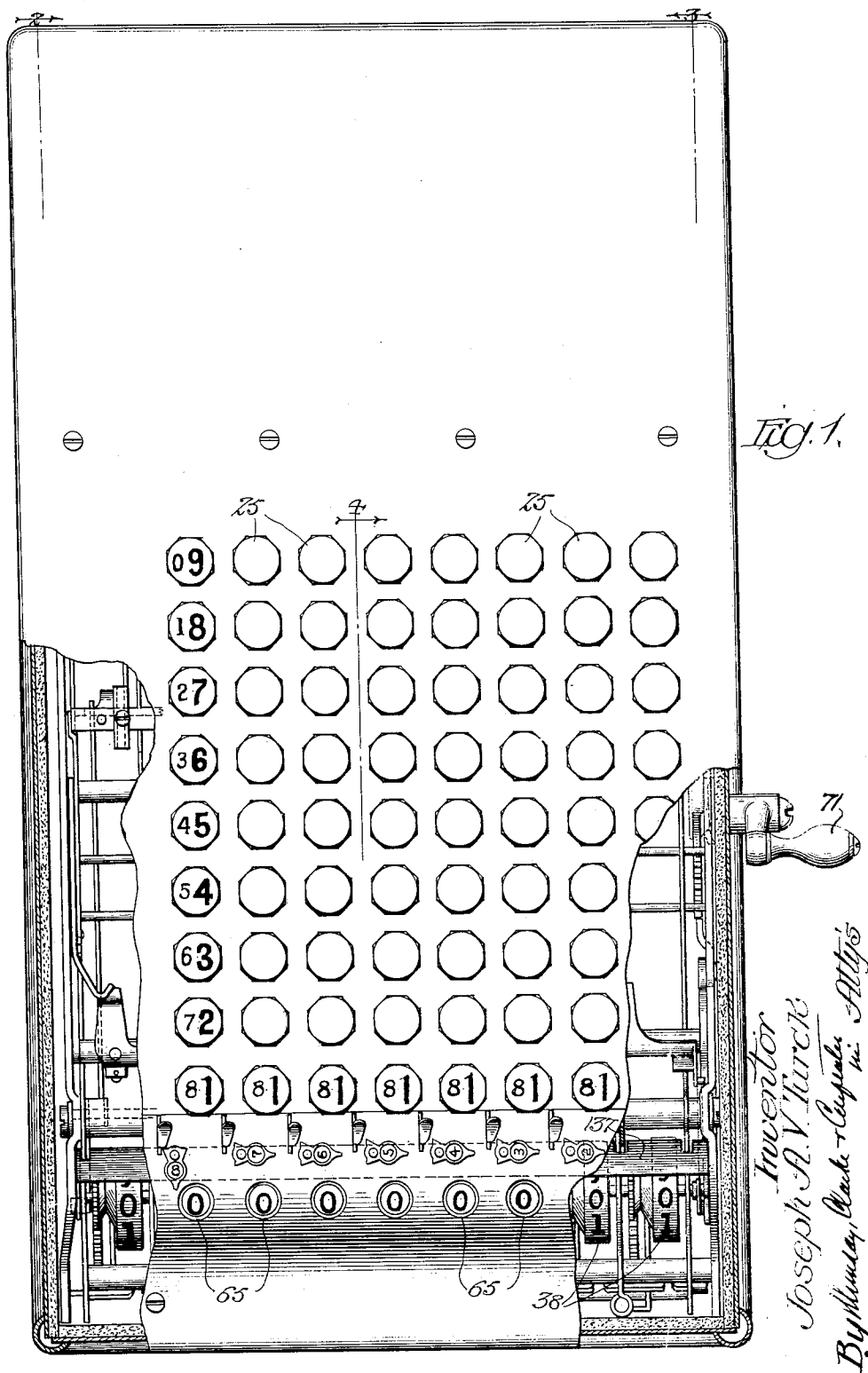
J. A. V. TURCK

1,714,964

CALCULATING MACHINE

Filed March 12, 1921

4 Sheets-Sheet 1



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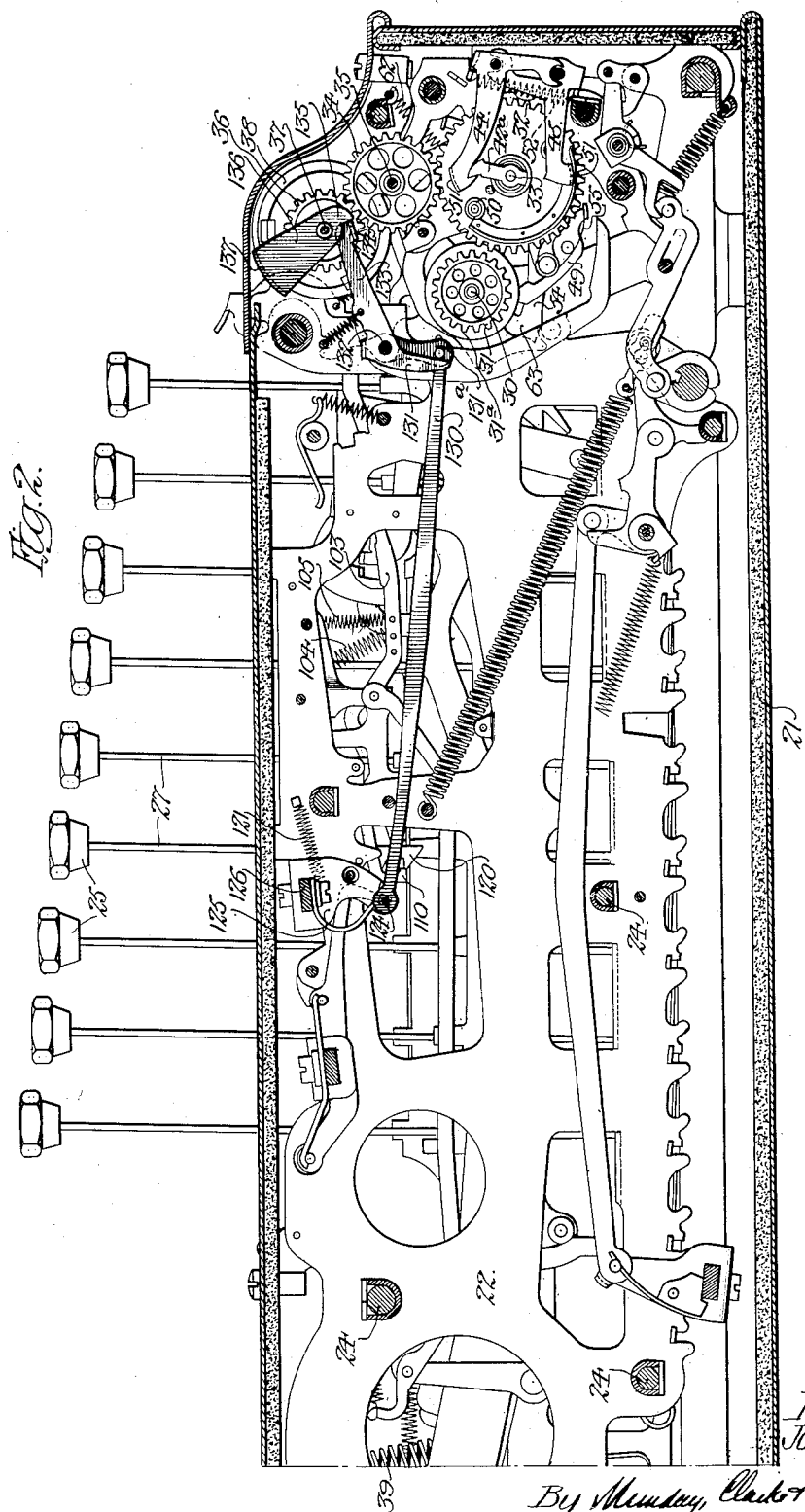
J. A. V. TURCK

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CALCULATING MACHINE

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4 Sheets-Sheet 2



Inventor
Joseph A. V. Turck

By Munday, Clark & Carpenter
Attorneys

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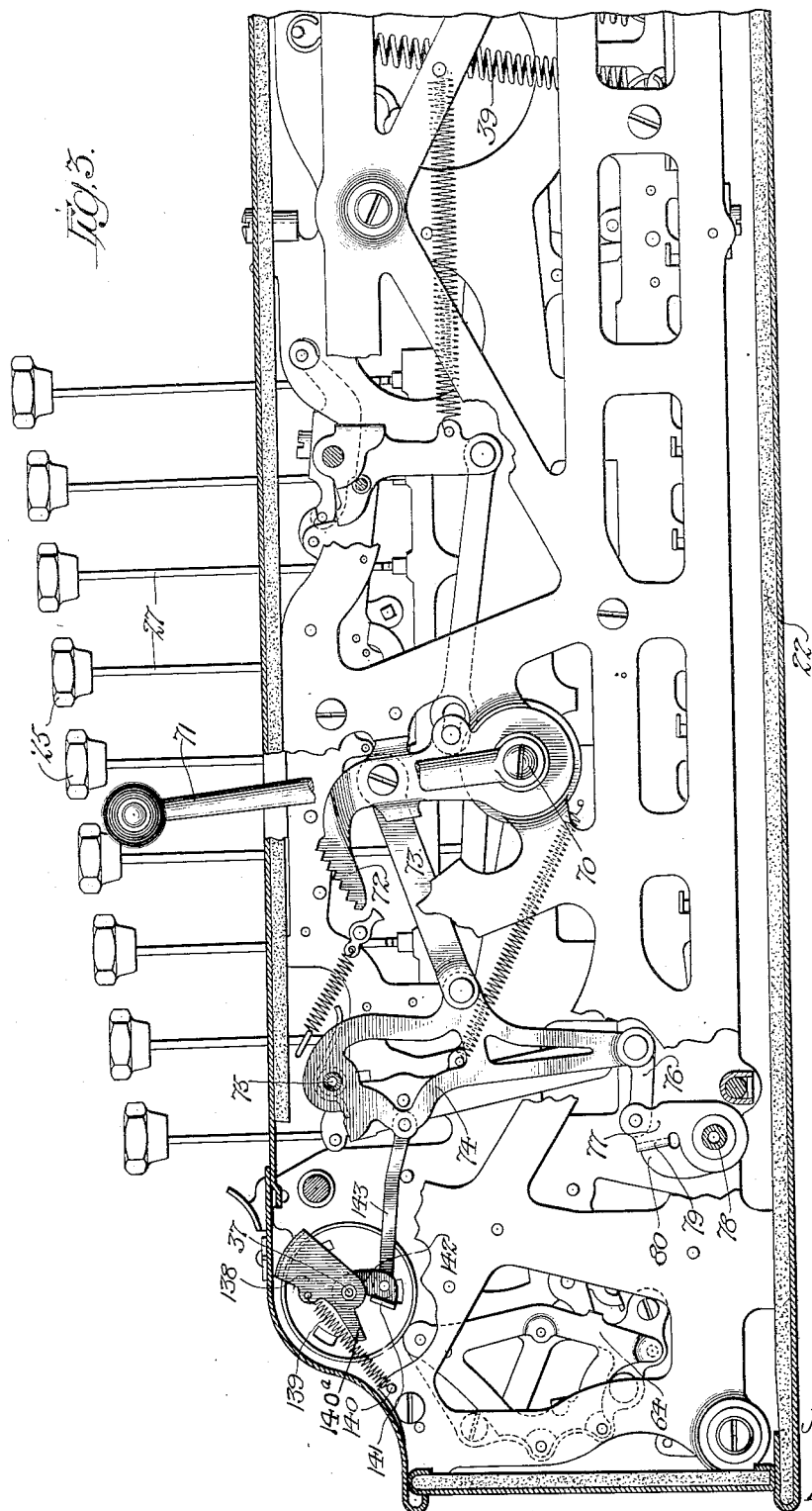
J. A. V. TURCK

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CALCULATING MACHINE

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Inventor
Joseph A. V. Turck

By Messrs. Clark & Carpenter
his Atty's

May 28, 1929.

J. A. V. TURCK

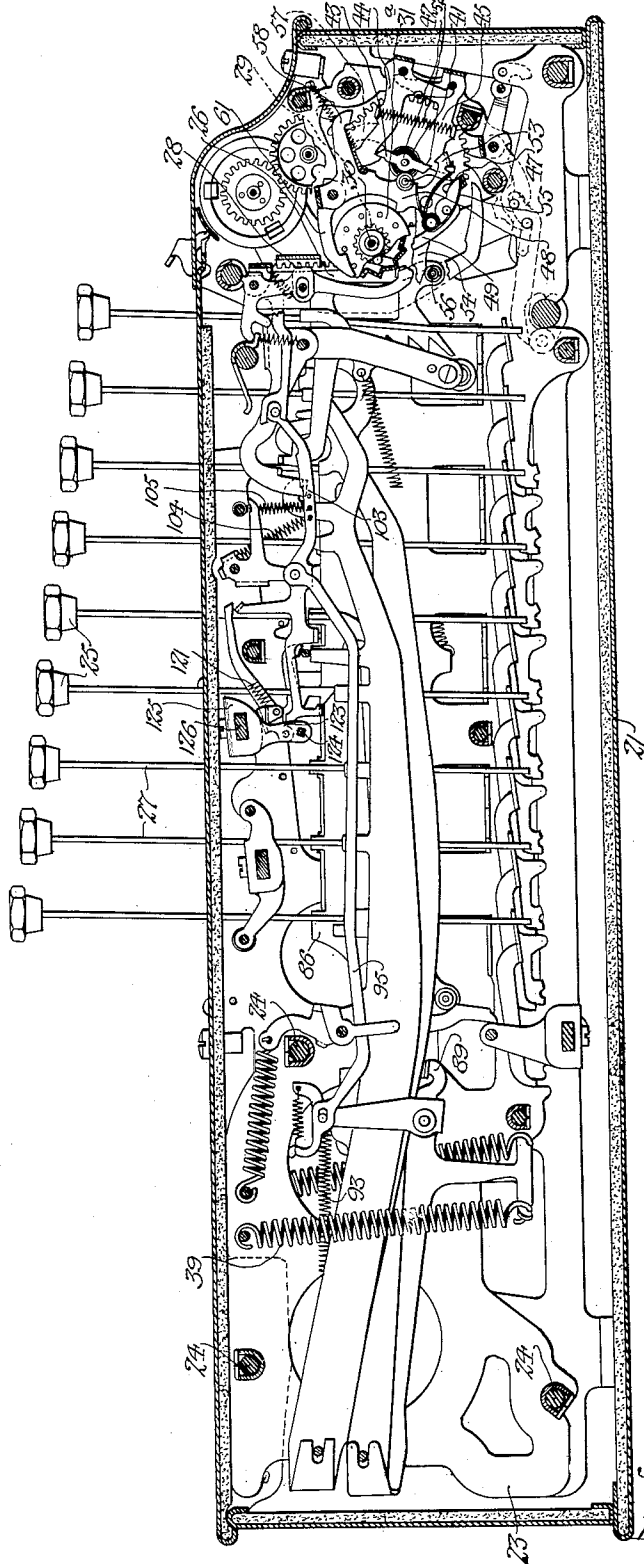
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Fig. 4



Inventor: -
Joseph A. V. Turck
By *Wm. L. Carpenter*
his Atty.

UNITED STATES PATENT OFFICE.

JOSEPH A. V. TURCK, OF WILMETTE, ILLINOIS, ASSIGNOR TO FELT & TARRANT MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CALCULATING MACHINE.

Application filed March 12, 1921. Serial No. 451,722.

This invention relates to calculating machines and has for its primary object to provide an improved mechanism for preventing errors in calculating operations, which may arise from mismanipulation of the keys; and the invention comprehends the provision of means for effecting an immediate visible indication to the operator of a mismanipulated key, such visible indication being, in the present embodiment of the invention a visual indicator which moves into an error-indicating position with respect to the items registered by the numeral wheels, immediately upon mismanipulation of a key, and remains in such position until a zeroizing operation has been effected to clear the machine. The invention is particularly applicable for use in connection with calculating machines of the key-driven multiple order type, although not necessarily restricted thereto, and, in the present embodiment, is illustrated in a machine of the general type of the well known "Duplex comptometer," the general character of which is exemplified in the United States patents to Dorr E. Felt, No. 762,520 and No. 762,521, dated June 29, 1904; No. 1,066,096, dated July 1, 1913; No. 1,072,933, dated September 9, 1913; the patent to Kurt F. Ziehm, No. 1,110,734, dated September 15, 1914, and my prior Patents Nos. 1,357,747 and 1,357,748, dated November 2, 1920.

In addition to the general object recited above, the invention has for further objects such other improvements and advantages in construction and operation as may be found to obtain in the structures and devices hereinafter described or claimed.

In the accompanying drawings, forming a part of this specification and showing, for purposes of exemplification, a preferred form and manner in which the invention may be embodied and practised, but without limiting the claimed invention specifically to such illustrative instance or instances, illustrates in

Figure 1 is a plan view, with parts broken away, of a calculating machine of the multiple order key-driven type in which the present improvements are embodied;

Figure 2 is a vertical sectional elevation taken at the left-hand side of the machine

in a plane indicated by the line 2—2 of Fig. 1;

Figure 3 is a vertical sectional elevation taken along the right-hand side of the machine in a plane indicated by the line 3—3 of Fig. 1; and

Figure 4 is a vertical sectional elevation taken in a plane indicated by the line 4—4 of Fig. 1.

The same characters of reference indicate the same parts in each of the several views of the drawings.

In its present embodiment, the invention is incorporated in a calculating machine of the multiple order key-driven type, such as the well known comptometer disclosed in prior United States Letters Patents hereinbefore referred to. The details of construction of this type of machine may be readily understood from these and other prior United States patents issued to Felt & Tarrant Manufacturing Company and reference is hereby made to such patents for a description of this type of machine.

The present invention comprehends the provision of means for effecting an immediate visible indication, to the operator, of a mismanipulated key, and, in the present instance, by the provision of a shutter which moves into a position to conceal the items registered by the numeral wheels, immediately upon mismanipulation of a key, and remains in such position until a zeroizing operation has been effected to clear the machine. The registrations effected by operation of the accumulator mechanism, in the manner hereinabove referred to, are viewed through sight openings located in the forward portion of the casing top, as shown more particularly in Fig. 1. Should a key be only partially depressed and released, the partial key stroke will, of course, effect only a partial operation of the accumulator mechanism in the order which the key controls, and consequently an erroneous result will be indicated in the registration made by the numeral wheels of the accumulator mechanism. When any key is partially depressed and released, the usual spring at the bottom of its stem will throw it up, but the actuator has moved the lantern wheel and connected numeral wheel an erroneous number

of numeral spaces, and the error is signaled by the movement of a visual indicator with respect to the several numeral wheels, such as a shutter, which may move into an error-indicating position in cooperation with the registrations viewed through the sight openings 65.

On the initial depression of a key, as above described, when the lever 103 (Fig. 2) moves forwardly, the arm 110 encounters the latch 120 on the point of its hook and forces it forward slightly and follows down, as the rear arm of the lever 103 tilts downward under pull of springs 104, 105, along with the incline of the hook of the latch, thus escaping being locked up. When in this position the arm 110 is tilted upwardly it displaces the latch forward and the spring 121 returns the latch under the arm to hold it up.

When a key is partially depressed and released, the forward end of lever 103 is elevated and so held by the springs 104 and 105, as above described. On release of the key, the accumulator is turned by the upward movement of the segment lever but the auxiliary lever 86 (Fig. 4) rises and lets up the arm 89 and the spring 93 pulls back the link 95 and lever 103 and the rear end 123 of the lever encounters and thrusts backward the square shaft 124 hung by the arms 125 from the rock bar 126. A link 130 (Fig. 2) is pivotally connected at its rear end to the shaft 124, and at its forward end with a swinging arm 131^a adapted to connect with the lower arm 131 of a bell crank pawl having its fulcrum on the shaft 132. Both said link 130 and the bell crank pawl are located on the left-hand side of the machine, as shown in Fig. 2. The other arm 133 of the aforesaid bell crank pawl extends forwardly and is provided at its extreme forward end with a detent 134 adapted to co-operate with a detent 135 at the lower end of the left-hand wing 136 of a shutter 137. The shutter 137 extends transversely across the machine over the top of the several numeral wheels 38 and is pivoted, by means of its left-hand wing 136 and a right-hand wing 138, on the shaft 37 of the numeral wheels. Referring to Fig. 3, a spring 139 connects the right-hand wing 138 of the shutter with a fixed part 140 of the frame.

On rearward movement of the square shaft 124, by means of the connections above described, which rearward movement takes place on partial depression and release of a key 25, the link 130 is pulled rearwardly, as well as the depending arm 131 of the bell crank pawl; and said rearward movement of the arm 131 is accompanied by a depression of the forward end of the arm 133, which depression moves the detent 134 out of engagement with the detent 135 at the lower end of the wing 136 of the shutter, thereby releasing the shutter from the restraining

influence of the arm 133 and freeing the spring 139. Thereupon the spring 139 pulls the shutter 137 forwardly into position for indicating an erroneous registration through the sight openings 65.

This forward movement of the shutter is accompanied by a rearward movement of a detent 140^a which projects downwardly below the pivot point 37 of the shutter. As the detent 140^a moves rearwardly, as viewed in Fig. 3, it engages a face 141 of a rocker arm 142 that depends from and is pivoted on the shaft 37. The lower end of the rocker arm 142 is pivotally connected by means of a link 143 with the lever arm 74.

On a zeroizing movement of the zeroizing lever 71 the rocker arm 74 is moved forwardly, in the manner hereinabove described, and the concurrent forward movement of the link 143 moves the detent 140^a forwardly and the shutter 137 rearwardly, said rearward movement of the shutter intum moving the detent 135 on its left-hand end into position for being reengaged by the detent 134 at the extreme forward end of the arm 133 of the bell crank lever.

The zeroizing movement of the lever 71 is accompanied by an operation which restores the square shaft 124 to its normal position, said operation being effected by instrumentalities fully shown and described in the foregoing-mentioned prior United States patents, and, as the mechanism for restoring the shaft 124 to normal position forms no part of the present invention, it need not be herein described in detail. The movement of the shaft 124 to normal, through the link 130 and depending arm 131 of the bell crank pawl, restores the detent 134 into position for reengaging the detent 135. Consequently, when the shutter has been moved rearwardly by the operation of the zeroizing lever as above described, the movement of the parts 124, 130, 131 and 133 into normal position effects a relocking of the shutter in its normal rear inoperative position.

The calculating machine described in the above specification embodies various other instrumentalities and devices which need not be herein described, for the reason that they are fully set forth in the prior patents above mentioned.

The invention as hereinabove set forth is embodied in a particular form of construction, but may be variously embodied in other forms of visual indicators adapted to be positioned in the sight apertures, within the scope of the claims hereinafter made.

I claim:

1. In a calculating machine, in combination: a plurality of keys; numeral wheels; actuating devices for said numeral wheels rendered operative upon movement of the keys; a shutter adapted to conceal the registrations made by said numeral wheels; spring

means for moving said shutter into position for concealing such registrations; devices for normally retaining said shutter in inoperative position; means operable on partial depression and release of a key for releasing said devices, to permit movement of said shutter into registration concealing position; a zeroizing crank; and connections between said zeroizing crank and said shutter operable during a zeroizing movement of said crank for restoring said shutter to its normal inoperative position; substantially as specified.

istration concealing position; and means for restoring such shutter to its normal inoperative position; substantially as specified.

5. In a calculating machine, in combination: a plurality of keys; an accumulator mechanism operable on movement of said keys for effecting registrations; a registration-concealing shutter for visually indicating key mismanipulation; means controlled by key mismanipulation for effecting the operation of said shutter; zeroizing means; and means controlled by said zeroizing means for rendering inoperative said shutter; substantially as specified.

2. In a calculating machine, in combination: a plurality of keys; numeral wheels; actuating devices for said numeral wheels rendered operative upon movement of the keys; a shutter adapted to conceal the registrations made by said numeral wheels, spring means for moving said shutter into position for concealing said registrations; devices for normally retaining said shutter in inoperative position; means operable on partial depression and release of a key for releasing said devices, to permit movement of said shutter into registration concealing position; a zeroizing crank and connections between said zeroizing crank and said shutter operable during a zeroizing movement of said crank for restoring said shutter to its normal inoperative position, said devices being movable into shutter restraining position during a zeroizing movement of said crank; substantially as specified.

6. In a calculating machine having a registration sight-opening means, in combination: a plurality of ordinal keys; an ordinal accumulator mechanism operable on movement of said keys for effecting registrations visible in said sight-opening means; a device for visually indicating, in said sight-opening means, key mismanipulation; and means controlled by key mismanipulation for effecting the operation of said indicating device; substantially as specified.

3. In a calculating machine, in combination: a plurality of keys; numeral wheels; actuating devices for said numeral wheels rendered operative upon movement of the keys; a shutter adapted to conceal the registrations made by said numeral wheels; spring means for moving said shutter into position for concealing such registrations; devices for normally retaining said shutter in inoperative position; means operable on partial depression and release of a key for releasing said devices, to permit movement of said shutter into registration concealing position; and means for restoring said shutter to its normal inoperative position; substantially as specified.

7. In a calculating machine, in combination: a plurality of ordinal keys; ordinal registers; actuating devices for the registers rendered operative upon movement of the keys; a register obscuration device; means for operating said obscuration device; means adapted normally to prevent operation of said obscuration device; and means operable on partial depression and release of a key for releasing said operation-preventing-means, to permit operation of said obscuration device; a zeroizing crank; and connections between said zeroizing crank and said obscuration device operable during a zeroizing movement of said crank for restoring said obscuration device to its normal inoperative position; substantially as specified.

4. In a calculating machine, in combination: a plurality of keys; numeral wheels; actuating devices for said numeral wheels rendered operative upon movement of the keys; a shutter movable into position for concealing the registrations made by said numeral wheels; devices for normally retaining such shutter in inoperative position; means operable on partial depression and release of a key for releasing said devices, to permit movement of such shutter into registration concealing position; and means for restoring such shutter to its normal inoperative position; substantially as specified.

8. In a calculating machine, in combination: a plurality of ordinal keys; ordinal registers; actuating devices for said registers rendered operative upon movement of the keys; a register obscuration device; means for operating said obscuration device; means adapted normally to prevent operation of said obscuration device; means operable on partial depression and release of a key for releasing said operation-preventing-means, to permit operation of said obscuration device; and means for restoring said obscuration device to its normal inoperative position; substantially as specified.

In testimony whereof, I have hereunto set my hand.

JOSEPH A. V. TURCK.