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A. E. OSWALD.

COMBINED TYPEWRITING AND COMPUTING MACHINE.

APPLICATION FILED OCT. 11, 1920.

1,438,718. Patented Dec. 12, 1922.

Fig. 1

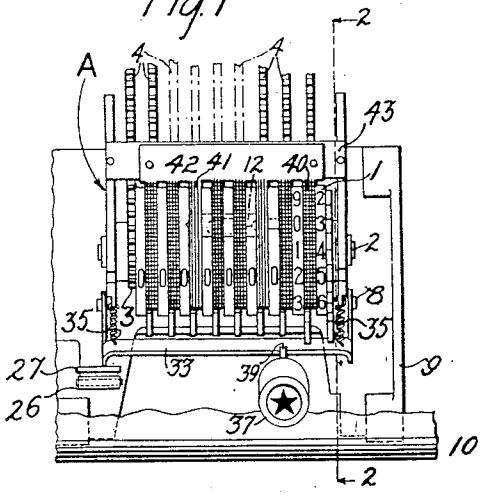


Fig. 2

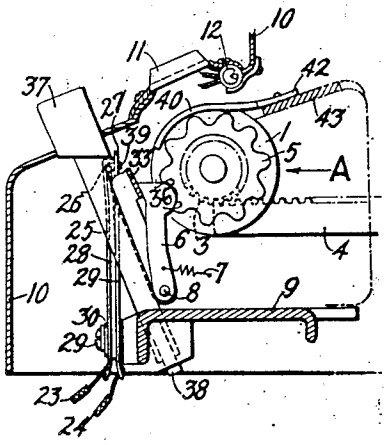


Fig. 3

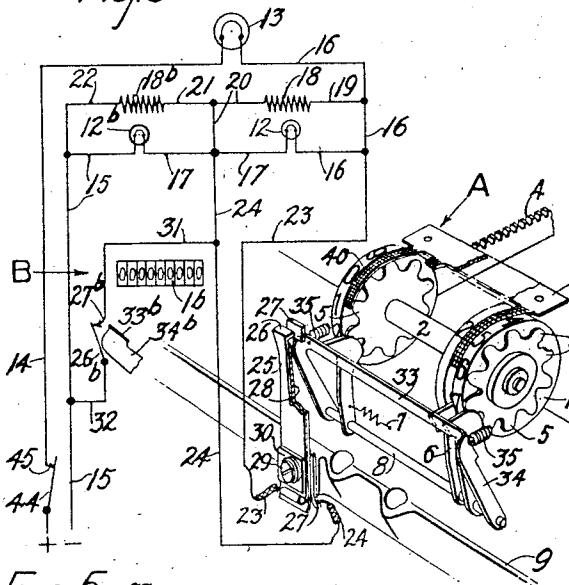


Fig. 4

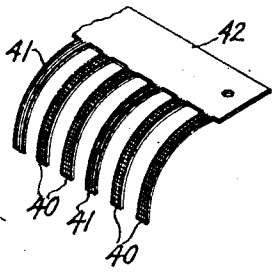
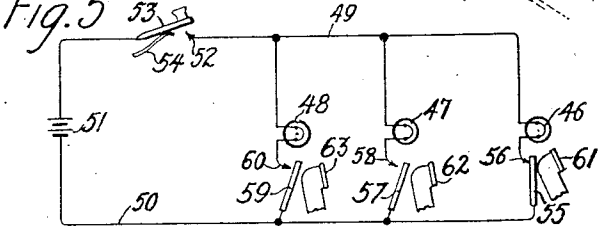


Fig. 5



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UNITED STATES PATENT OFFICE.

ALFRED E. OSWALD, OF BOGOTA, NEW JERSEY, ASSIGNOR TO UNDERWOOD COMPUTING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

COMBINED TYPEWRITING AND COMPUTING MACHINE.

Application filed October 11, 1920. Serial No. 416,248.

To all whom it may concern:

Be it known that I, ALFRED E. OSWALD, a citizen of the United States, residing in Bogota, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Combined Typewriting and Computing Machines, of which the following is a specification.

This invention relates to the registers or totalizers of computing machines, especially those of the type known as the Underwood standard bookkeeping machine, which both typewrites and computes.

The registers are provided with electric lamps to illuminate the number-wheels and provision is made whereby when any register is out of use, its lamp is automatically extinguished, thereby indicating to the operator whether or not any register stands at zero. The register-lamps for the several registers may be connected in a lighting circuit in series relation, and means are provided, whereby, should the lamp for any register fail, the lamp for any other register may be continued in use. According to one form of the present invention, the register-lamps may be connected in series in a lighting circuit, and a suitable resistance is connected in multiple around each register-lamp, thereby providing a shunt for the lighting circuit around each register-lamp that fails and enabling any other register-lamp in the series to be continued in use. In this form of the present invention, each register-lamp may be controlled by means of a short circuit controlled by the number-wheels of the corresponding register, and in order to prevent a destructive rush of current through the short circuit, which otherwise in this arrangement would be established when all of the registers stood at the zero indication, a suitable main resistance, which may be in the form of a desk lamp, may be included in series in the lighting circuit. This series arrangement of the register-lamps just referred to is particularly adapted for connection to the supply mains of a usual or suitable electrical supply system, supplying either direct or alternating current.

According to another form of the present invention which may be connected with any suitable supply of electrical energy, but which is particularly adapted to be operated on a battery circuit, the register-lamps are connected in the lighting circuit in multiple, so that, should a register-lamp fail, the lamps for the remaining registers may be continued in use. With a battery circuit it is particularly desirable to economize electricity in order to conserve the battery, and therefore the arrangement is such that the main circuit from the battery is normally open. Provision is made of a manually-operable circuit-controller or switch by means of which the normally open circuit may be closed momentarily or for a short period long enough to observe the condition of the registers, and preferably this main circuit-controller includes an automatically-returning contact-member, and may conveniently be in the form of an ordinary push-button for closing the circuit when pressed upon and for automatically opening the circuit when released. It is obvious that the push-button feature could be provided in the first described or series circuit arrangement of the register-lamps in any case where it should prove of particular importance to economize the use of electricity. It is also to be noted that the last-mentioned form of the invention, in which the register-lamps are arranged in multiple, could, if desired, be employed in a lighting circuit energized from supply mains, similarly to the series arrangement.

As another feature of the present invention, a non-reflecting or light-absorbing device is provided to fill the usual spaces between the peripheries of the coaxially-arranged number-wheels, at the side from which these number-wheels are viewed, thereby to accentuate the visibility of the numerals on the number-wheels, particularly when illuminated by the register-light. This light-absorbing device may be in the form of curved fingers of dark color projecting from and formed in one piece with a supporting plate conveniently secured to a frame part of the machine.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a fragmentary plan view of the front part, at the right side and with parts omitted, of an Underwood standard bookkeeping machine embodying the present invention, and showing some of the number-wheels as turned away from the zero position, so that, according to the present invention, the register-light would be lit to give

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this indication as well as to illuminate the number-wheels.

Figure 2 is a partial vertical section on a plane indicated by the line 2—2 of Figure 1 as viewed from the right, but with the parts of the device in the position corresponding to the zero position of all of the number-wheels in the register and with the register-light extinguished, to apprise the operator of the fact that the register is clear.

Figure 3 is a perspective view from the front and right, of substantially what is shown in Figure 1, with the addition, in diagram, of another register and the electrical circuit for both registers, showing the register-lamps as arranged in series relation in a lighting circuit.

Figure 4 is a perspective view, with parts omitted, illustrating more particularly in detached relation, the light-absorbing device appearing in Figures 1, 2 and 3.

Figure 5 shows diagrammatically a modified form of the invention in which the register-lamps may be included in the lighting circuit in multiple relation.

In the Underwood standard bookkeeping machine, one or several totalizers or registers are employed, and in the machine illustrated in Figures 1 to 4, inclusive, of the accompanying drawings, two totalizers or registers A and B are employed, the register A being illustrated sufficiently for the purposes of the present invention, while the register B, which may be a substantial duplicate of the register A, is shown diagrammatically at the left in Figure 3. Each register, reference now being had more particularly to the register A, includes a plurality of coaxially-arranged number-wheels 1 journaled on a shaft 2 and rotated by means of gears 3 engaged by rack-bars 4, each number-wheel 1 being provided with detent-teeth 5 yieldingly engaged by a spring-pressed detent 6 pressed to the engaging position by a retractile spring 7, all of the detents 6 being shown as pivoted on a rod 8.

The machine has the usual frame 9 and casing 10, the casing 10 having therein for each register a glass-covered sight-opening or window 11 in position for reading the indication given by the line of numerals visible therethrough on the number-wheels 1. In carrying out the present invention, register-lights 12 and 12^b, each of which may be a miniature incandescent lamp, are provided for illuminating the number-wheels 1 and 1^b of the respective registers A and B. These register-lamps 12 and 12^b may be located within the casing 10 at the rear of the respective sight-openings above and in position to illuminate the numerals on the number-wheels 1 and 1^b of the registers A and B, as shown for the register A in Figures 1 and 2.

The register-lamps 12 and 12^b may be included in a lighting circuit in series relation with each other and with a suitable resistance 13, which may be a desk-lamp, as indicated in Figure 3, by means of a main conductor 14 connected to the desk-lamp 13, a second main conductor 15 connected to the register-lamp 12^b, a conductor 16 connecting the desk-lamp 13 to the register-lamp 12, and a conductor 17 between the register-lamps 12 and 12^b. As an important feature of the present invention, means are provided whereby should one of the register-lamps 12 or 12^b burn out, or otherwise fail, the lighting circuit may be maintained intact through the other register-lamp, so that the latter may be continued in use for illuminating the number-wheels of the corresponding register. To accomplish this result, a suitable resistance 18 is connected in multiple with the register-lamp 12 by means of a conductor 19 connected to the conductor 16, and a conductor 20 connected to the conductor 17; and, similarly, the register-lamp 12^b for the register B has a similar suitable resistance 18^b connected in multiple therewith by means of a conductor 21 connected to the conductor 20 and a conductor 22 connected with the main conductor 15. By means of this arrangement, it is obvious that should one of the register-lamps fail, a shunt path for lighting current will be provided around that lamp through the corresponding resistance, so that the other register-lamp may be continued in use.

Means are provided, controlled by the number-wheels of each of the registers, for extinguishing the corresponding register-lamp when the number-wheels all stand at zero, and for lighting the register-lamp when any number-wheel of the register is moved away from its zero position. In the particular form of the invention, shown in Figures 1 to 4, inclusive, a short circuit is provided for each of the register-lamps, and this short circuit is arranged to be closed for extinguishing the register-lamp at the zero indication of the number-wheels, and to be opened for lighting the register-lamp when any number-wheel of the register stands away from zero. This lamp-controlling short circuit for the register-lamp 12 at the register A includes conductors 23 and 24 leading respectively from the conductors 16 and 17. The conductor 23 is electrically connected to an upright contact spring 25, supported at its lower end, and at its upper end turned over rearwardly to form a movable contact terminal 26, normally pressed by the spring 25 into engagement with a stationary contact terminal 27, shown as a comparatively rigid upstanding plate, to which the conductor 24 is connected. The contact spring 25 and the stationary contact plate 27 are insulated from each other by an interposed insulating strip

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28. The lower ends of the contact strips 25 and 27 are secured by a screw 29 to the usual front bar of the frame 9 and are insulated therefrom and from the screw 29 by means of insulating washers 30, two of which appear in Figures 2 and 3. Normally or when all of the number-wheels 1 of the register A stand at the zero indication, the short circuit for the register-lamp 12 will be closed by reason of the contact spring 25 holding the movable contact terminal 26 in contact with the stationary contact terminal 27. A similar normally closed short circuit is provided for the register-lamp 12^b of the register B through a conductor 31 shown as connecting the conductor 24 to a stationary contact terminal 27^b, and a conductor 32 connecting the main conductor 15 to a spring-pressed movable contact terminal 26^b. When both of the short circuits around the register-lamps 12 and 12^b are in closed condition, the desk-lamp 13 will provide sufficient resistance to prevent a destructive rush of current through the normally closed circuit thus provided.

Referring now again more particularly to the register A illustrated in Figures 1 and 2, and at the right of Figure 3, the means operated by the number-wheels 1 for moving the movable contact 26 away from the stationary terminal 27, thereby to open the short circuit and light the register-lamp 12 when any one of the number-wheels is moved away from zero indication, will now be described. A member universal to all of the detents 6 is shown in the drawings as in the form of a bail comprising a transverse bail member 33 carried at its ends by a pair of upstanding rock arms 34, pivoted at their lower ends on the pivot rod 8 of the detents 6. Springs 35 normally press the transverse member 33 backward until it is stopped by coming in contact with one or more of the detents 6 at the back thereof. The upper end of the insulating strip 28, carried by the contact spring 25, is located in the path of the upper end of one of the bail arms 34, shown as the one appearing at the left in register A, so that when the universal bail, comprising the transverse member 33 and the arms 34, is at its forward position, appearing in Figures 1 and 3, the movable contact terminal 26 will be separated from the stationary contact terminal 27 to close the lighting circuit through the register-lamp 12, and when this universal bail is at its rearward position, as shown in Figure 2, the movable contact terminal 26 will be in contact with the stationary contact terminal 27 to close the short circuit and extinguish the register-lamp 12.

At the proper place thereon, corresponding to its zero position, two adjacent teeth 5 of each number-wheel 1 are cut away or provided with recesses 36, thereby to permit the detents 6 to be seated more deeply between these two adjacent teeth. By reason of this construction, when all of the number-wheels 1 stand at zero position, all of the detents 6 will be thus more deeply seated in the recesses 36 between the corresponding cut-away teeth, thereby permitting the transverse bail member 33 to be moved by its springs 35 to the rearward position, for closing the short circuit for the register-lamp through the contact terminals 26 and 27, as shown in Figure 2. The detent-receiving notches provided between all the remaining number-wheel teeth 5, corresponding to the digits "1" to "9", inclusive, are of insufficient dimensions to permit the deep seating of the detents 6, which accordingly hold the transverse bail member 33 at its forward position thereby to hold the movable contact terminal 26 out of engagement with the stationary contact terminal 27, so that the lighting circuit is thereby closed through the register-light 12 when any one of the number-wheels 1 stands away from its zero indication, as is shown in Figure 1 and at the right of Figure 3.

The register B, appearing at the left in Figure 3, is similarly provided with a circuit-controlling universal bail operated by the number-wheels 1^b, and comprising the transverse member 33^b, universal to all of the number-wheels 1^b and carried by rock-arms 34^b, of which the upper part of one is shown in Figure 3. In the case of the register B, the short circuit, which is provided through conductors 31 and 32 and controlled by contact-terminals 26^b and 27^b, is shown as closed, thereby to extinguish the register-lamp 12^b, corresponding to the zero indication of the register B, as shown in Figure 3, the rock-arm 34^b of the universal member 33^b being disengaged from the movable contact-terminal 26^b to permit this spring-pressed contact-terminal 26^b to close against the stationary contact-terminal 27^b, as shown.

For printing an appropriate sign, usually a star, when all the number-wheels stand at zero, there is provided, as is usual in the Underwood type of bookkeeping machine, a star-printing key 37, having a stem 38 guided in the frame 9 of the machine. The upper part of the star-key stem 38, at the rear thereof, is provided with a locking lug 39. Referring now to the register A, and more particularly to Figure 2, it will be seen that when the universal bail-member 33 is at its rearward position, corresponding to the zero indication, the lug 39 will clear this bail-member to provide for the operation of the star-key 37, but when any number-wheel 1 is moved away from its zero indication, then the above-described movement of the universal bail-member 33

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to its forward position will bring this member into the path of the locking lug 39 to lock the star-key 37 when any number-wheel stands away from zero. Therefore, it is to be noted that the universal bail, comprising the transverse member 33 and rock-arms 34, besides controlling the register-light 12 of the register A, also controls the corresponding star-key 37. It is to be understood that a star-key similar to the star-key 37 is provided for each of the registers of the machine.

In order to accentuate the visibility of the number-wheels 1, so as to render the numerals thereon more readily readable, dark colored substantially non-reflecting or light-absorbing filling pieces are provided between the spaced peripheries of the number-wheels 1, at the top thereof, opposite the sight-opening or window 11, and below and forwardly from the register-light 12. In the construction shown in the drawings, these light-absorbing filling pieces are shown as a plurality of curved fingers comprising black fingers 40 and red fingers 41, all carried by, and shown as formed in one piece with, a supporting plate 42 secured to a frame-part 43 of the register A. The curved light-absorbing fingers 40 and 41 are substantially flush with the numeral-bearing peripheries of the number-wheels 1, and, by reason of their dark color, not only accentuate the illumination of the number-wheels, but also prevent the reflection of the light of the lamp 12 from bright parts between the number-wheels into the eyes of the operator, and which would have a tendency to interfere with the reading of the numbers on the number-wheels. In the particular construction shown in the drawings, the two red fingers 41 are employed for separating or demarking the hundreds number-wheel from the first thousands number-wheel, and the last thousands number-wheel from the first millions number-wheel, being readily distinguishable for this purpose from the remaining black fingers 40, but all of the fingers 40 and 41 perform a similar light-absorbing function. Obviously, the red fingers 41 could be otherwise disposed between the black fingers 40, to demark the number-wheels into other groups, for example, to separate decimal number-wheels from the units number-wheel. The light-absorbing device, comprising fingers 40 and 41 and their supporting plate 42, is similarly applied to both of the registers A and B, but, for convenience of illustration, is illustrated in the drawings only in connection with the register A. In other words, it is to be understood that this light-absorbing device is to be applied to each of any number of registers that may be employed on the machine.

For extinguishing all of the lamps in the lighting circuit, comprising the register-lamps 12 and 12^b and the desk-lamp 13, or for including these lamps in the lighting circuit, subject to control as above described, a manually-operable switch is provided, and this circuit-controlling switch is shown as comprising a movable manually-operable contact-member 44 and a stationary contact-member 45, connected in the main conductor 14. If for any reason it is particularly desirable to economize in electricity, the movable switch-member 44 may be left normally at the open position and closed temporarily or momentarily whenever it is desired to observe the condition of the registers, and in such an installation the movable switch-member 44 could be a spring-returned push-button, and the resistance 13 need not be a lamp.

In the modified form of the invention diagrammatically illustrated in Figure 5, three register-lamps 46, 47 and 48, for a corresponding number of registers, are arranged to be included in multiple or parallel relation between a pair of main conductors 49 and 50, connected to a battery 51 as a source of current. In order to conserve the battery 51, a normally open manually-operable circuit-controller for the main circuit is provided which may be an ordinary push-button. This circuit-controller is shown diagrammatically as comprising a stationary contact-terminal 52 and a movable automatically-returning contact-terminal 53 normally maintained at the open position shown in the drawings by means of a spring 54. In this form of the invention, the circuits for the register-lamps 46, 47 and 48 are normally open when the number-wheels of the corresponding registers stand at the zero position. For controlling their circuits, the register-lamp 46 is provided with a movable contact-member 55 co-operative with a stationary contact-terminal 56, the register-lamp 47 is controlled by a similar movable contact-member 57 co-operative with a stationary contact-terminal 58, and the register-lamp 48 is similarly controlled by a movable contact-member 59 co-operative with a stationary contact-terminal 60. It is to be understood that the movable contact-members or contact-terminals 55, 57 and 59 are all spring-pressed, so as to have a normal tendency to return automatically to the open-circuit position of the movable terminals 57 and 59 for the register-lamps 47 and 48. For the respective registers, universal members 61, 62 and 63 are provided to be controlled by the number-wheels of each register in the manner above particularly described in reference to the number-wheels 1 and 1^b in the first-described construction. In Figure 5, the universal member 61 is shown in position for closing the circuit through the register-lamp 46 to light this lamp, indicating that a number has been

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run into the corresponding register, while the universal members 62 and 63 for the registers corresponding to the register-lamp 47 and 48 are shown at the position for extinguishing these lamps, when all of the number-wheels stand at the zero indication. By reason of the fact that the register-lamps 46, 47 and 48 are connected to the main conductors 49 and 50 in parallel relation, it will be obvious that should one of these lamps fail, the remaining lamps may be continued in use.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. In a computing machine, the combination with a plurality of registers each including number-wheels, of a register-lamp for each register, means controlled by each register for establishing a lighting circuit through its lamp when any number-wheel of the register moves away from zero, and means for maintaining the operativeness of the lighting circuit for any register-lamp independently of the condition as to operativeness of the lighting circuit for any other register-lamp.

2. In a computing machine, the combination with a plurality of registers each including number-wheels, of a register-lamp for each register, a universal member for each register operable by the number-wheels to occupy one position when all the number-wheels stand at zero and to occupy another position when any number-wheel stands away from zero, means operable by each universal member for establishing a lighting circuit through the corresponding register-lamp when any number-wheel of the register moves away from zero, and means for maintaining the operativeness of the lighting circuit for any register-lamp independently of the condition as to operativeness of the lighting circuit for any other register-lamp.

3. In a computing machine, the combination with a plurality of registers each including number-wheels, of a register-lamp for each register for illuminating its number-wheels, a lighting circuit for each register-lamp, means including a circuit-controller in control of each said lighting circuit, a member universal to and operable by the number-wheels of each register for operating the circuit-controller for that register to cause its lamp to be lighted whenever any one of its number-wheels moves away from zero, and means for maintaining the operativeness of the lighting circuit for any register-lamp independently of the condition as to operativeness of the lighting circuit for any other register-lamp.

4. In a computing machine, the combination with a plurality of registers each including number-wheels, of a register-lamp for each register, a lighting circuit in which the register-lamps may be included in series, means including a circuit-controller operated by the turning of any number-wheel of a register away from zero for including the register-lamp of that register in the lighting circuit to light the lamp, and a resistance connected in multiple with each register-lamp for maintaining the integrity of the lighting circuit around any lamp which may fail, so that should the lamp for any one register fail the lamp for any other register may be continued in use.

5. In a computing machine, the combination with a plurality of registers each including number-wheels, a register-lamp for each register, a lighting circuit in which the register-lamps may be included in series, a normally closed short circuit for each register-lamp, means operated by the turning of any number-wheel in a register away from zero for opening the short circuit of the register-lamp for that register, thereby to light the register-lamp, and a resistance connected in multiple with each register-lamp for maintaining the integrity of the lighting circuit around any register-lamp which may fail so that should the lamp for any register fail the lamp for any other register may be continued in use.

6. In a computing machine, the combination with a plurality of registers each including number-wheels, of a register-lamp for each register, a main lamp, a lighting circuit including the main lamp and in which the register-lamps may be included in series, means including a circuit-controller operated by the number-wheels for including the register-lamp for that register in the lighting circuit, thereby to light the register-lamp when any number-wheel of a register is turned away from zero, and a resistance connected in multiple with each register-lamp, whereby should any register-lamp fail the resistance for that lamp will provide a shunt around such lamp so that any other register-lamp in the series may be continued in use.

7. In a computing machine, the combination with a plurality of registers including number-wheels, of a register-lamp for each register, a lighting circuit including a main resistance and in which the register-lamps may be included in series, a resistance in multiple with each register-lamp to provide a path for lighting current around the lamp in case of failure of the latter, a normally closed short circuit for each register-lamp and means operated by the number-wheels for any register for opening the short circuit, to light the register-lamp when the number-wheel of any register is turned from zero.

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8. In a computing machine, the combination with a plurality of registers each including number-wheels, of a main lamp, a register-lamp for each register for illuminating the number-wheels thereof, a lighting circuit including the main lamp and in which the register-lamps may be included in series, a resistance connected in multiple with each register-lamp to provide a path for lighting current around the latter in case of its failure, and a member universal to and operable by the number-wheels of each register for including the register-lamp for that register in series in the lighting circuit with the main lamp, thereby to light the register-lamp when any number-wheel of that register is turned away from zero.

9. In a computing machine, the combination with a plurality of registers each including number-wheels, of a main resistance, a register-lamp for each register for illuminating the number-wheels, a lighting circuit including the main resistance and in which the register-lamps may be included in series, a resistance connected in multiple with each register-lamp to provide a path for lighting current around the latter in case of its failure, a normally closed short circuit for each register-lamp, a switch in control of each short circuit, and a member universal to and operable by the number-wheels of each register for operating the switch to open the short circuit, thereby to light the register-lamp whenever any one of the number-wheels is moved away from zero.

10. In a computing machine, the combination with a plurality of registers each including number-wheels, of a main lamp, a register-lamp for each register for illuminating the number-wheels thereof, a lighting circuit including the main lamp and in which the register-lamps may be included in series, a circuit-controlling device for each register-lamp operable by the number-wheels thereof, and a resistance connected in multiple with each register-lamp to provide a shunt around that lamp, whereby should any register-lamp fail any other lamp in the series may be continued in use.

11. In a computing machine, the combination with a plurality of registers each comprising number-wheels, of a main resistance, a register-lamp for each register in series with the main resistance, a short circuit for each register-lamp, a circuit-controlling device for each register and controlled thereby to control the short circuit for its register-lamp, and a resistance in multiple with each register-lamp to provide a path for lighting current around that lamp, whereby should any register-lamp fail any lamp for any other register may be continued in use.

12. In a computing machine, the combination with a plurality of registers each including number-wheels, of a detent for each number-wheel, a member universal to the detents for each register to be operated thereby, a spring normally tending to move the universal member into operative relation with the detents, each number-wheel being adapted when moved away from zero to move its detent and thereby to move and hold the universal member against the tension of its spring, a register-lamp for each register, a lighting circuit in which the register-lamps may be included, means in control of each register-lamp including contact-terminals controlled by the universal member to light the register-lamp whenever a number-wheel is moved away from zero, and means for maintaining the operativeness of the lighting circuit for any register-lamp independently of the condition as to operativeness of the lighting circuit of any other register-lamp.

13. In a computing machine, the combination with a plurality of registers each including number-wheels, of a detent for each number-wheel, a member universal to the detents for each register to be operated thereby, a spring normally tending to move the universal member into operative relation with the detents, each number-wheel being adapted when moved away from zero to move its detent, and thereby to move and hold the universal member against the tension of its spring, and an electric circuit comprising a main resistance, register-lamps for each register, connected in series with each other and with the main resistance, a normally closed short circuit connected in multiple with each register-lamp, a switch in control of each short circuit and operable by the universal member to open the short circuit whenever a number-wheel moves away from zero, and a resistance connected in multiple with each resigter-lamp, whereby should any register-lamp fail the resistance for that lamp will provide a path for lighting current through any other register-lamp in the series.

14. In a computing machine, the combination with a register including number-wheels, of a register-lamp for illuminating the number-wheels, a lighting circuit for the register-lamp, means controlled by the number-wheels for controlling the lighting circuit to prevent the lighting of the lamp when all of the number-wheels are at the zero position and to provide for the lighting of the lamp when any number-wheel is moved away from its zero position, and a manually-operable circuit-controller including an automatically-returning contact-member also controlling the lighting circuit and normally preventing the lighting of the register-lamp, whereby the condition of the register may be at any time determined by operating the manually-operable circuit-controller.

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15. In a computing machine, the combination with a plurality of registers each including number-wheels, of a register-lamp for each register, means for establishing a lighting circuit for each lamp, means for each register in control of the lighting circuit of its register-lamp to prevent or permit the lighting of the lamp depending upon the position of the number-wheels and adapted to prevent the lighting of the lamp when all of the number-wheels are at zero and to permit the lighting of the lamp when any number-wheel is moved away from zero, and a manually-operable circuit-controller including an automatically-returning contact-member for maintaining a normally open circuit in control of the lighting circuits for all of the register-lamps, whereby the condition of any register may be observed at any time by operating the manually-operable circuit-controller.

16. In a computing machine, the combination with a plurality of registers each including number-wheels, of a register-lamp for each register, said lamps being connected in series, means controlled by each register for establishing a lighting circuit through its lamp when any number-wheel of the register moves away from zero, and means for maintaining the operativeness of the lighting circuit for any register-lamp independently of the condition as to operativeness of the lighting circuit for any other register-lamp.

17. In a computing machine, the combination with a register including a plurality of coaxially-arranged and peripherally-spaced number-wheels, of dark substantially non-light-reflecting filling pieces occupying successive spaces between the number-wheels for accentuating the visibility of the numerals on the number-wheels.

18. In a computing machine, the combination with a register having a frame part and including a plurality of coaxially-arranged and peripherally-spaced number-wheels, of a supporting plate fixed on the frame part, and dark curved light-absorbing fingers formed in one piece with and extending from said plate into successive spaces between the spaced peripheries of the number-wheels substantially flush therewith for accentuating the visibility of the numerals on the number-wheels.

19. In a computing machine, the combination with a register including a plurality of coaxially-arranged and peripherally-spaced number-wheels, of a plurality of differently colored comparatively dark stationary light-absorbing-filling pieces arranged successively between the peripheries of the number-wheels substantially flush therewith adjacent to the upper sides thereof, some of the filling pieces being of a color distinctively different from the others for demarking the number-wheels into groups.

20. In a computing machine, the combination with a register having a frame part and including a plurality of coaxially-arranged and peripherally-spaced number-wheels, of a light-absorbing device for the number-wheels comprising a supporting plate secured to the frame part, and dark substantially non-light-reflecting curved fingers formed in one piece with the supporting plate and extending therefrom into successive spaces between the peripheries of the number-wheels substantially flush therewith adjacent the upper sides thereof for rendering the numerals on the number-wheels more easily readable.

21. In a computing machine, the combination with a register including a plurality of coaxially-arranged and peripherally-spaced number-wheels, and a casing having a sight-opening above the wheels and slightly forward of the vertical plane through the axis of the number-wheels, of a register-lamp for the register positioned in the casing just to the rear of the sight-opening to illuminate the upper sides of the number wheels and dark substantially non-light-reflecting filling pieces arranged successively between the peripheries of the number-wheels adjacent to the upper sides thereof and below the register-lamp for accentuating the illumination of the peripheries of the number-wheels by the register-lamp, said filling pieces extending across the field of sight through said sight-opening.

22. In a computing machine, the combination with a register, having a frame part and a plurality of coaxially-arranged and peripherally-spaced number-wheels, and a casing having a sight-opening above the wheels and slightly forward of the vertical plane through the axis of the number-wheels, of a register-light in the casing just to the rear of the sight-opening, for illuminating the upper sides of the peripheries of the number-wheels, and a light-absorbing device comprising a supporting plate secured to the frame part, and a plurality of dark substantially non-light-reflecting curved fingers formed in one piece with and extending from said plate between the peripheries of successively adjacent number-wheels adjacent to the tops thereof and substantially flush therewith for accentuating the illumination of the number-wheels by the register-light, some of the fingers being of a color distinctively different from the others for thereby demarking the number-wheels into groups.

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Witnesses:
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