

May 9, 1933.

S. L. WALSOE

1,908,157

COMPUTING MACHINE

Filed Sept. 10, 1930

2 Sheets-Sheet 1

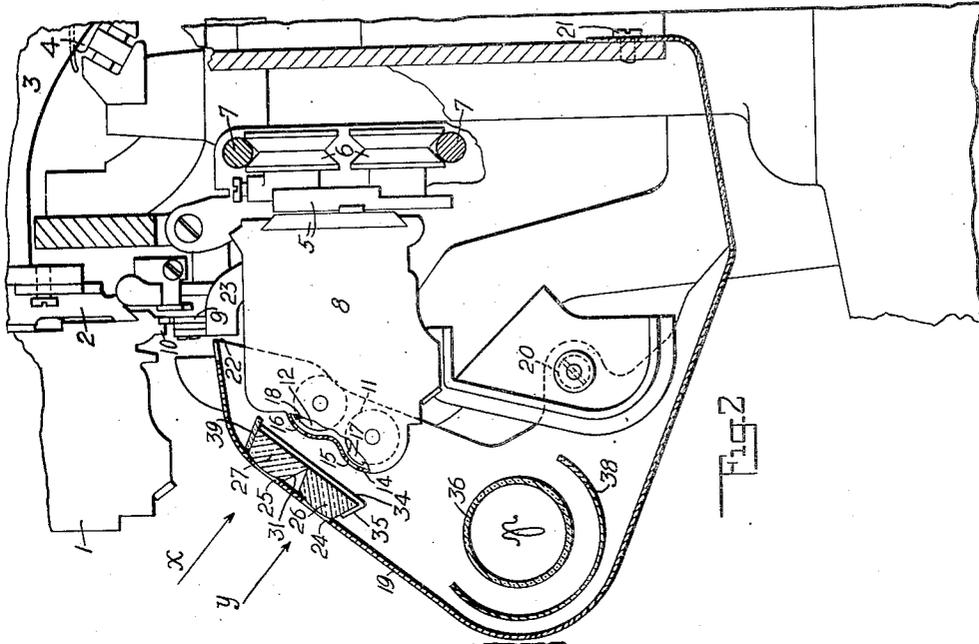
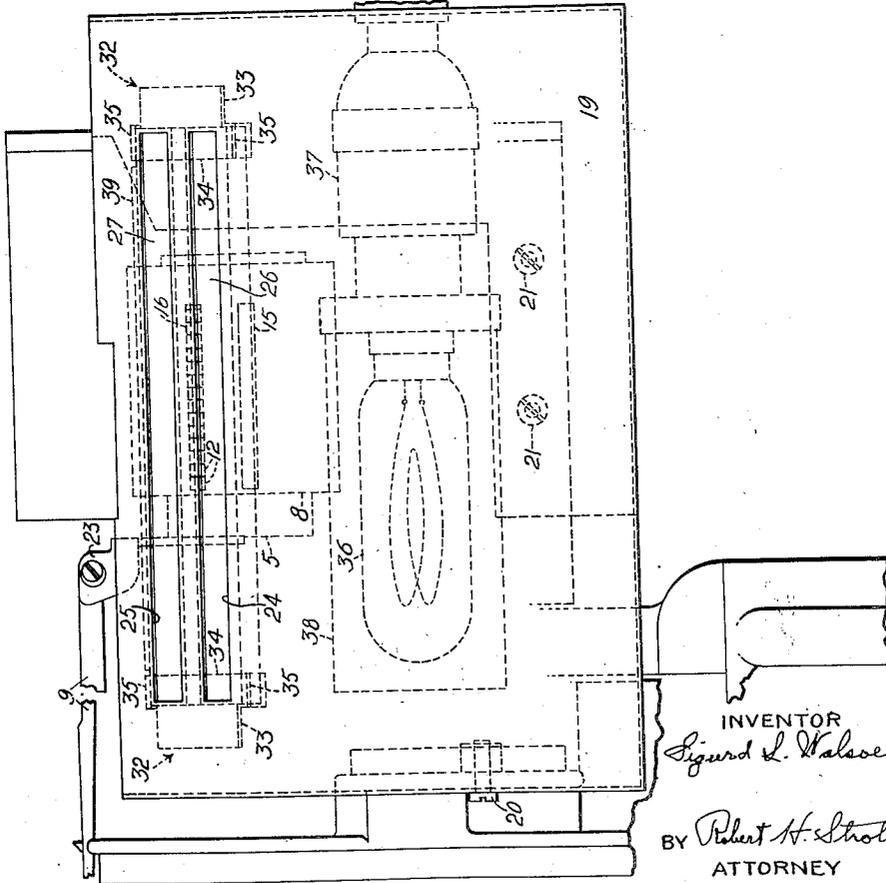


Fig. 1



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2 Sheets-Sheet 2

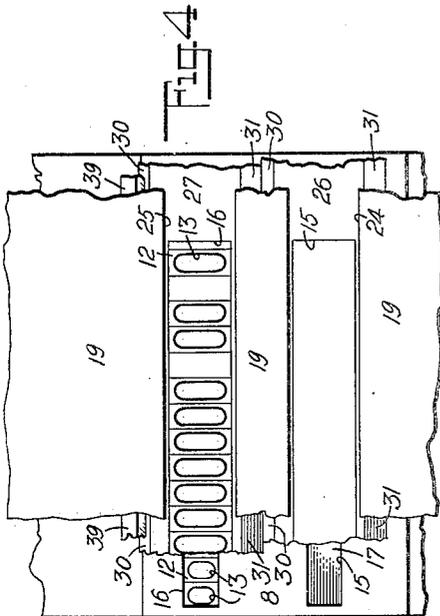


FIG. 4

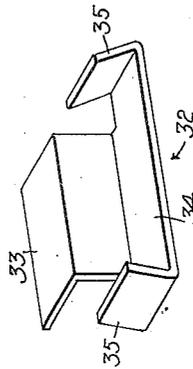


FIG. 5

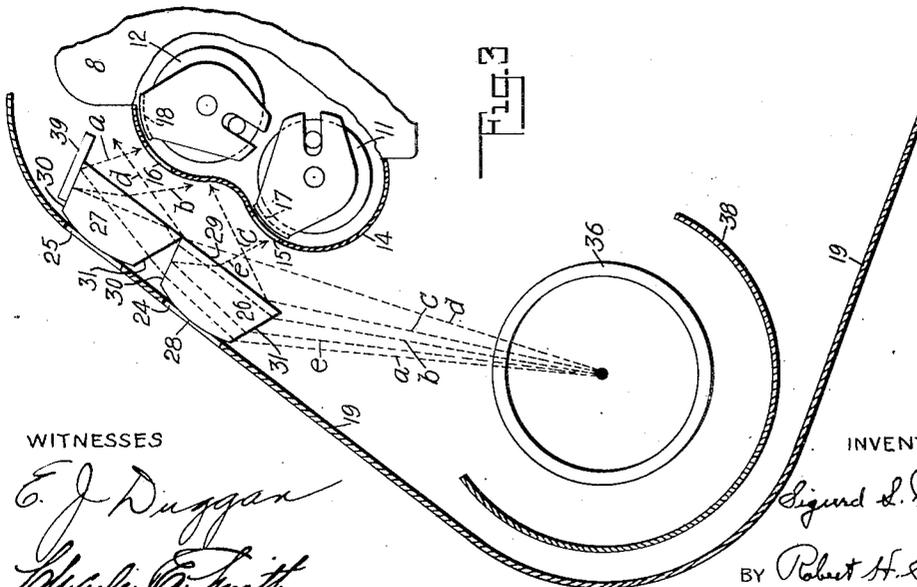


FIG. 3

WITNESSES

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# UNITED STATES PATENT OFFICE

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## COMPUTING MACHINE

Application filed September 10, 1930. Serial No. 480,886.

My invention relates to computing machines and more particularly to means whereby the numerals on the register wheels may be more readily seen by the operator.

5 One of the main objects of my invention is to provide means for attaining the ends referred to without modifying in any manner the existing structural features of the computing machine, and which means are in the  
10 nature of an attachment that can be readily placed on the machine at a comparatively small cost.

To the above and other ends which will hereinafter appear my invention consists in  
15 the features of construction, arrangements of parts and combinations of devices set forth in the following description and particularly pointed out in the appended claims.

In the accompanying drawings, wherein  
20 like reference characters designate corresponding parts in the different views:

Fig. 1 is a fragmentary, full-sized, front view showing a portion of a combined typewriting and computing machine equipped  
25 with the attachment of my invention.

Fig. 2 is a detail, fore and aft, vertical, sectional view of the same, the parts being shown full-sized.

Fig. 3 is an enlarged, detail, diagrammatic  
30 view of some of the parts illustrated in Fig. 2.

Fig. 4 is an enlarged, detail, fragmentary, front view of some of the parts represented in Fig. 3.

Fig. 5 is an enlarged, detail, perspective  
35 view of one of the brackets for holding the lenses in place.

I have shown my invention applied in the present instance to a Remington accounting machine, which is a combined typewriting  
40 and computing machine of the same general character as that disclosed in the patent to Wahl, No. 1,270,471, dated June 25, 1918, although the invention is not restricted to use in said machine.

45 The machine in question includes a cross-foot totalizer carried by a cross-truck that is at times picked up by and travels in unison with the typewriter carriage and has a return movement to normal position independent  
50 of the typewriter carriage. This cross total-

izer is off-set to one side of the center of the machine, and due to its position and the fact that the numerals on the register wheels of the cross totalizer are necessarily small by  
55 reason of the compact construction of the mechanism, such numerals cannot always be readily observed by the operator. This is especially true when an algebraic totalizer is employed. In the present instance I have  
60 associated the devices of my invention with this cross totalizer, although the invention is not restricted in this connection, and may be employed wherever found available in computing and like machines.

In the accompanying drawings I have  
65 shown only so much of the Remington accounting machine as is necessary to illustrate my invention in its embodiment therein, it being understood that all of the structural  
70 features of this machine are of the usual construction and are not modified by the embodiment of the features of the present invention in the machine.

Referring more particularly to Fig. 2, it  
75 will be seen that vertical totalizers 1 are carried in the usual manner by a supporting bar 2, connected to arms 3 carried by the typewriter carriage 4.

A cross-truck 5 carries wheels 6 by which  
80 it is mounted to travel along fixed guide rails 7 supported by the main frame of the machine. A cross totalizer 8 is carried by the truck 4 and travels therewith in the usual manner. The usual pick-up beam 9 is connected to the cross-truck 5 and is successively  
85 engaged by pick-up lugs 10 on the vertical totalizers 1 to move the cross-truck, and the cross totalizer 8 carried thereby, in unison with the typewriter carriage. The usual  
90 spring means (not shown) are employed to return the cross-truck to the right independently of the typewriter carriage when the vertical totalizer to which the cross-truck is connected passes out of the computing zone.

All of the features as thus far described  
95 constitute parts of the usual equipment of the Remington accounting machine of the type illustrated in said Wahl patent and further detailed description thereof is deemed  
100 unnecessary.

In the present instance I have shown an algebraic cross totalizer 8 of the same general character as that sometimes employed in the Remington accounting machine. This is a double, algebraic totalizer employing two sets of register wheels 11 and 12 arranged one set above the other, as shown in Fig. 3. Each register wheel has the usual numerals 13 (Fig. 4) around the periphery thereof, the numerals on the wheels of one set being arranged in an order the reverse of that on the wheels of the other set. A totalizer shell or housing 14 encloses the cross totalizer, including the register wheels 11 and 12 thereof, and is provided with the usual slots or sight openings 15 and 16, the former exposing an aligned set of numerals 13 on the lower set of register wheels, and the sight opening 16 exposing a set of aligned numerals 13 on the upper set of register wheels.

Such construction is sometimes provided with shutters 17 and 18 so operatively connected and controlled that when the shutter 18 is removed from the sight opening 16 to expose the numerals on the upper register wheels 12, the lower shutter 17 will close its opening 15 so that the numerals on the lower set of register wheels 11 cannot be seen, and vice versa. In some instances, however, no shutters are employed or deemed necessary.

As hereinbefore pointed out it is difficult at times to see the exposed numerals on the register wheels 11 and 12 by reason of the fact that they are necessarily small, and the cross-foot totalizer is off-set to one side of the machine.

It is the purpose of the present invention to overcome this difficulty by the provision of the following means.

An outer housing 19 is fixedly, though removably, secured to the frame of the machine by means of a screw 20, usually employed in the machine for another purpose, and by screws 21. It will be observed that this housing 19 encloses the cross totalizer 8 and, as shown in Fig. 2, terminates at its upper rear edge 22 in front of the pick-up beam 9 and the bracket arm 23 by which said pick-up beam is connected to the cross-truck. By reason of this construction the fixed housing 19 offers no obstruction to the travel of the cross totalizer 8, its truck 5 and pick-up beam 9, etc.

The outer housing 19 is provided with two elongated sight openings 24 and 25 arranged one above the other to accord with the arrangement of the sight openings 15 and 16 in the totalizer shell, and arranged in the line of the operator's vision of the sight openings 15 and 16, as indicated by the arrows  $x$ ,  $y$ , in Fig. 2. However, each of the sight openings 24 and 25 is wider and longer than the associated sight opening 15 or 16. This enlargement of the sight openings 24 and 25 is done for a twofold purpose. First the width

of each sight opening 24 and 25 is increased in order that the exposed numerals 13 on the register wheels, when viewed through a magnifying glass or lens as indicated in Fig. 4, may be clearly observed in their enlarged up and down dimensions. The lengthwise dimension of each sight opening 24 and 25 is increased in order that the numerals 13 may be readily seen therethrough whatever may be the position of the cross totalizer in its traveling movement.

Opposite each sight opening 24 and 25 is a magnifying glass or lens 26 or 27. Each lens fills its sight opening and the shape of both are substantially the same, so that a description of one applies to the other. Each lens has a convex outer or forward face 28 seated from the rear in its sight opening. The rear face 29 of each lens is substantially flat, whereas its upper edge 30 and its lower edge 31 are beveled in opposite directions for reasons which will presently appear.

Both of the lenses 26 and 27 are contained within the outer housing 19 and project inwardly from the inner face thereof, which may be nickel-plated to provide a reflecting surface. The lenses are held in place by angular sheet metal brackets, each of which is designated as a whole by the reference numeral 32, and one of which is shown detached in Fig. 5. The foot piece 33 of each bracket may be soldered or otherwise secured to the inner face of the housing 19. An extension 34 extends beneath and underlies the ends of both of the lenses 26 and 27, and said extension is bent forward at its ends 35 to embrace the lenses and hold them in contact with each other.

Contained within the housing 19 is an electric bulb or lamp 36, removably secured in a lamp socket 37 fixedly secured by any suitable means (not shown) in the housing 19. This lamp socket is connected with a suitable plug by which connection with the power line may be readily established. The only available space within the housing 19 where an effective electric light bulb may be placed is below the cross totalizer, and where the direct rays of light from the lamp will not illuminate the numerals 13 exposed at the sight openings 15 and 16. It therefore becomes necessary to obtain an illumination of such numerals by reflected light rays. This I obtain in the present instance in the following manner. Contained within the housing 19 beneath the electric light bulb 36, and supported by the lamp socket 37, is a curved reflector 38 that extends throughout the length of the bulb and reflects the light rays upwardly through lenses 26 and 27, to the inner flat faces 29 thereof, to the beveled edge 30 of the lower lens 26 and to the intermediate space between said lenses and the front of the cross totalizer, as indicated in part diagrammatically by the dotted lines  $a$ ,  $b$ ,  $c$ ,  $d$ , and  $e$  in Fig. 3. Ar-

ranged above the lens 27, and coincident with the upper beveled face 30 thereof, is a reflector 39 in the nature of a looking glass that extends throughout the length of said lens

5 and overlaps the upper rear edge thereof. The position of this reflector is such that it will reflect light rays that pass through both lenses 26 and 27 (as indicated by the dotted lines *a* and *b*) to the sight openings 15 and 16 in the totalizer 8, and more particularly to the latter opening which is the most difficult to illuminate from the lamp 36. I have not attempted to diagram all of the light rays that will be reflected to the upper sight opening 16, it being sufficient to indicate that light rays between the lines *a* and *b* reflected from the member 39 will illuminate the upper sight opening 16, whereas the light rays between the lines *c*, *d* reflected from the rear flat faces of the lenses 26 and 27 also will illuminate the numerals at the upper sight opening 16.

It is not practicable to arrange a lamp out in front of the dials so as to illuminate them by direct light and the lamp has accordingly been disposed in the space available for it, namely, below and a very little in front of the vertical totalizers. The device works on the principle that the light for illuminating the dials is deflected toward the dials by the lenses themselves which are so designed in prismatic form as to have that effect. The flat surfaces of these lenses are polished so that when light strikes them part of it is reflected back while part of it passes on through the surface. Thus a ray of light from the filament striking the surface 31 of the lower lens 26 will be refracted into a direction somewhere near parallel to the rear surface 29 of the lens. When this light strikes the opposite surface 30 some of it is transmitted on to the upper lens 27 and some of it is reflected back by internal reflection. A similar thing happens when the light strikes the lower surface 31 of the upper lens 27. This light is, however, twice refracted toward the rear and enters the lens 27 in a more rearwardly inclined direction than that which entered the lens 26. Light passing on through the upper surface 30 would perform no useful function and the mirror 39 is therefore provided to reflect all of it back. A few rays have been drawn in Fig. 3 to illustrate the general principles of the device. Thus the ray "*a*" striking the surface 31 near its forward edge is refracted as shown and, of course, part of it is reflected back from the upper surface 26. The part of it that goes on into and through the upper lens is traced and it will be perceived that it is reflected back from 30 and 39 and reaches about the upper edge of the sight opening 16. A ray striking the lower surface 31 a little to the rear of this one would enter the sight opening 16.

65 The ray "*e*" is traced as it is reflected back

from the upper surface 30 of the lower lens 26 to where it enters the sight opening 15. Of course, part of this ray would continue on into the upper lens.

The ray "*b*" entering the lower lens near the rear thereof is traced as first refracted rearward at the surface 31, again refracted rearward at the surface 30 of the lower lens, and again refracted rearward at the surface 31 of the upper lens until it strikes the rear surface of the upper lens, from where it is reflected to the upper surface 30 and the mirror 39 and comes back in a direction approximately toward the upper sight opening 16.

The rays "*c*" and "*d*" are traced as reflected from the rear surfaces of the lenses. Neither of these enters either of the sight openings.

Some of the light is reflected from the rear surface of the plate 19 and some of this would enter the lens 26.

In addition to the light which is actually reflected in straight rays into the sight openings it will be perceived that the whole system is full of criss-cross rays of light reflected and refracted from the different surfaces. This would result in a certain amount of diffused light which also would enter the sight openings and assist in illuminating the dials.

In the particular disposition of the parts shown, in order to direct the rays of light as desired the angle between the lower surface 31 of one of the lenses and the rear surface 29 is somewhat sharper than that between the surface 29 and the upper surface 30. These angles would, of course, in different specific instances of the invention, be worked out in each case according to the position of the source of light and that of the object to be illuminated.

Where two lenses are employed in the situation shown in the drawing it is advantageous that they both be made alike where that is possible, and they are so shown in the present instance, the reason being in order to avoid confusion in assembling the device which might result from the two lenses being of different shapes. It will be noted that the source of light is back of the general plane in which the lenses are arranged which general plane is about parallel to the inclined part of the plate 19.

It will be perceived that as far as most of the illumination is concerned these lenses act rather as prisms, the convex outer surfaces having little or no function in illuminating the dials. In case the magnification was not desired therefore, the dials could be illuminated by prismatic bars of glass all of whose surfaces were plane.

In practice I have found that due to the construction and arrangement of the parts, and to the factors of direct reflection, transmitted reflection, refractive index in the lenses themselves, etc., I am enabled to obtain

highly satisfactory results in effectively illuminating the numerals exposed at either of the sight openings 15 or 16.

The character of each lens 26, 27, with its surface 28 made as a section of a cylinder, is such that exposed numerals seen there-through will not be magnified transversely, but will be magnified up and down increasing the height of the numerals as I have attempted to indicate in Fig. 4. This, it is found, gives most satisfactory results and avoids confusion.

All of the parts of my attachment are carried by the housing 19 and this may be readily applied to the machine by the screws 20 and 21 without in any manner interfering with the operation of the machine.

It will be seen therefore that I have provided a simple, comparatively inexpensive and highly efficient attachment for attaining the ends hereinbefore pointed out.

What I claim as new and desire to secure by Letters Patent is:

1. The combination of an accounting machine register having an enclosing shell with the usual sight opening therein through which numerals on the register wheels are exposed, an outer housing enclosing said register and having a sight opening through which exposed numerals on the register wheels may be seen, a magnifying glass in the sight opening of the housing, an electric light bulb contained within said housing below said register, and a reflector beneath said bulb for reflecting the light upwardly between the shell and outer housing to illuminate the exposed numerals on the register wheels that may be seen through said magnifying glass.

2. The combination of a traveling totalizer having an enclosing shell with the usual sight opening therein through which numerals on the register wheels are exposed, an outer fixed housing enclosing said totalizer and in which the totalizer is adapted to travel, said fixed housing having a sight opening through which exposed numerals on the register wheels may be seen in any position of travel of the traveling totalizer, a magnifying glass in the sight opening of the housing, and illuminating means contained within the housing for illuminating the exposed numerals on the register wheels which may be seen through said magnifying glass.

3. The combination of a traveling totalizer having an enclosing shell with the usual sight opening therein through which numerals on the register wheels are exposed and an outer fixed housing enclosing said totalizer and in which the totalizer is adapted to travel, said fixed housing having a sight opening through which exposed numerals on the register wheels may be seen in any position of travel of the traveling totalizer, a magnifying glass in the sight opening of the fixed housing, an electric light bulb contained within said hous-

ing below said register, and a reflector beneath said bulb for reflecting the light from said bulb upwardly between the shell and fixed housing to illuminate the exposed numerals on the register wheels that may be seen through said magnifying glass.

4. The combination of an accounting machine register having an enclosing shell with the usual sight opening therein through which numerals on the register wheels are exposed, an outer housing enclosing said register and having a sight opening through which exposed numerals on the register wheels may be seen, a magnifying glass in the sight opening of the housing, an electric light bulb contained within said housing below said register, a reflector beneath said bulb for reflecting the light upwardly between the shell and outer housing to illuminate the exposed numerals on the register wheels that may be seen through said magnifying glass, and a second reflector contained within said housing and arranged above said register to further aid in reflecting light to illuminate the exposed numerals on the register wheels.

5. The combination with an accounting machine having a totalizer with a double set of register wheels and a shell therefor having two sight openings therein, one for each set of register wheels, of a housing which encloses said totalizer and has two sight openings, one for each of the sight openings in the totalizer shell, a magnifying glass in each of the sight openings in the housing, and illuminating means contained within said housing and illuminating the numerals exposed at either of the sight openings in the totalizer shell.

6. The combination with an accounting machine having a traveling totalizer with a double set of register wheels and a shell therefor having two sight openings therein, one for each set of register wheels, of a fixed housing which encloses said totalizer and in which the totalizer is adapted to travel, said housing having two sight openings, one for each of the sight openings in the totalizer shell and through which exposed numerals on either set of register wheels may be seen in any position of travel of the totalizer, a magnifying glass in each of the sight openings in the housing, and illuminating means contained within said housing and illuminating the numerals exposed at either of the sight openings in the totalizer shell.

7. The combination with an accounting machine having a totalizer with a double set of register wheels arranged one set above the other, and a shell therefor having two correspondingly arranged sight openings therein, one for each set of register wheels, of a housing which encloses said totalizer and has two sight openings, one for each of the sight openings in the totalizer shell, a magnifying glass in each of the sight openings in the housing, and illuminating means contained within said

housing and illuminating the numerals exposed at either of the sight openings in the totalizer shell, the magnifying glass being contained within said housing in such position that light rays from the illuminating means may pass from below through the magnifying glasses and be reflected to the upper sight opening in the shell.

8. The combination with an accounting machine having a traveling totalizer with a double set of register wheels arranged one set above the other and a shell therefor having two correspondingly arranged sight openings therein, one for each set of register wheels, of a fixed housing which encloses said totalizer and in which the totalizer is adapted to travel, said housing having two sight openings, one for each of the sight openings in the totalizer shell and through which exposed numerals on either set of register wheels may be seen in any position of travel of the totalizer, a magnifying glass in each of the sight openings in the housing, and illuminating means contained within said housing and illuminating the numerals exposed at either of the sight openings in the totalizer shell, the magnifying glasses being contained within said housing in such position that light rays from the illuminating means may pass from below through magnifying glasses and be reflected to the upper sight opening in the shell.

9. The combination with a totalizer having a shell having the usual sight opening therein to expose numerals on register wheels contained within said totalizer, of a housing enclosing said totalizer and having a sight opening therein, a magnifying glass at said sight opening in the housing, said magnifying glass having a convex outer or front surface, oppositely beveled top and bottom edges and a substantially flat rear surface, and illuminating means contained within said housing and illuminating exposed numerals on the register wheels that may be seen through said magnifying glass.

10. The combination of a totalizer having two sets of register wheels, one set arranged above the other, a shell for said totalizer having correspondingly arranged sight openings therein to expose numerals on said register wheels, a housing enclosing said totalizer and having sight openings therein that correspond to but are larger than said sight openings in the shell, a magnifying glass at each sight opening in the housing, each magnifying glass having a convex outer or front surface, oppositely beveled top and bottom edges and a substantially flat rear surface, and illuminating means contained within said housing and illuminating exposed numerals on the register wheels that may be seen through either of said magnifying glasses.

11. The combination of a traveling totalizer having two sets of register wheels, one set arranged above the other, a shell for said

totalizer having correspondingly arranged sight openings therein to expose numerals on said register wheels, a fixed housing enclosing said totalizer and in which the totalizer travels, said housing having sight openings therein that correspond to but are larger than said sight openings in the shell and through which numerals exposed on the register wheels may be seen whatever be the position of the totalizer in its line of travel, and a magnifying glass at each opening in the housing, each magnifying glass having a convex outer or front surface, oppositely beveled top and bottom edges and a substantially flat rear surface, and illuminating means contained within said housing and illuminating exposed numerals on the register wheels that may be seen through either of said magnifying glasses.

12. The combination with a totalizer having a shell with the usual sight opening therein to expose numerals on register wheels contained within said totalizer, of a housing enclosing said totalizer and having a sight opening therein, a magnifying glass at said sight opening in the housing, said magnifying glass having a convex outer or front surface, oppositely beveled top and bottom edges and a substantially flat rear surface, an electric light bulb contained within said housing below the totalizer, a reflector beneath said bulb for reflecting the light rays upwardly and a reflector above said magnifying glass for reflecting the light rays to the sight opening in the totalizer.

13. The combination of a totalizer having two sets of register wheels, one set arranged above the other, a shell for said totalizer having correspondingly arranged sight openings therein to expose numerals on said register wheels, a housing enclosing said totalizer and having sight openings therein that correspond to but are larger than said sight openings in the shell, a magnifying glass at each opening in the housing, each magnifying glass having a convex outer or front surface, oppositely beveled top and bottom edges and a substantially flat rear surface, and illuminating means contained within said housing and illuminating exposed numerals on the register wheels that may be seen through either of said magnifying glasses, said illuminating means comprising an electric light bulb in the housing below said totalizer, a reflector beneath said bulb, and a second reflector above the upper magnifying glass which reflects light rays that pass through said magnifying glasses to the upper sight opening in the totalizer.

14. The combination with a totalizer having a shell with the usual sight opening therein to expose numerals on register wheels contained within said totalizer, of a housing enclosing said totalizer and having a sight opening therein, a magnifying glass at said

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sight opening in the housing, said magnifying glass having a convex outer or front surface, oppositely beveled top and bottom edges and a substantially flat rear surface, and illuminating means contained within said housing and illuminating exposed numerals on the register wheels that may be seen through said magnifying glass, said illuminating means comprising an electric light bulb contained within said housing below the totalizer, a curved reflector below said bulb, and a flat reflector arranged at an inclination above the top beveled edge of the magnifying glass and coincident with the upper beveled edge thereof to reflect light rays that pass through the magnifying glass to the sight opening in the totalizer.

Signed at Stamford in the county of Fairfield and State of Connecticut this 9th day of September, A. D. 1930.

SIGURD L. WALSOE.

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