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EXPENSE REGISTER.

APPLICATION FILED NOV. 1, 1906.

919,587.

Patented Apr. 27, 1909.

5 SHEETS—SHEET 1.

Fig. 1

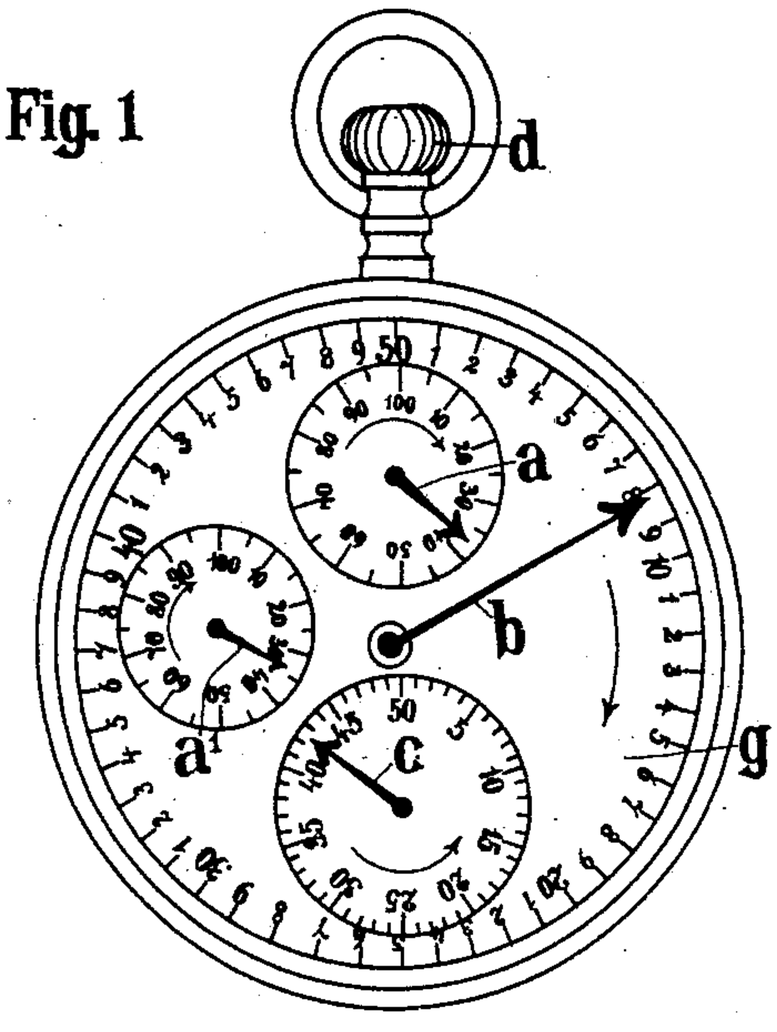
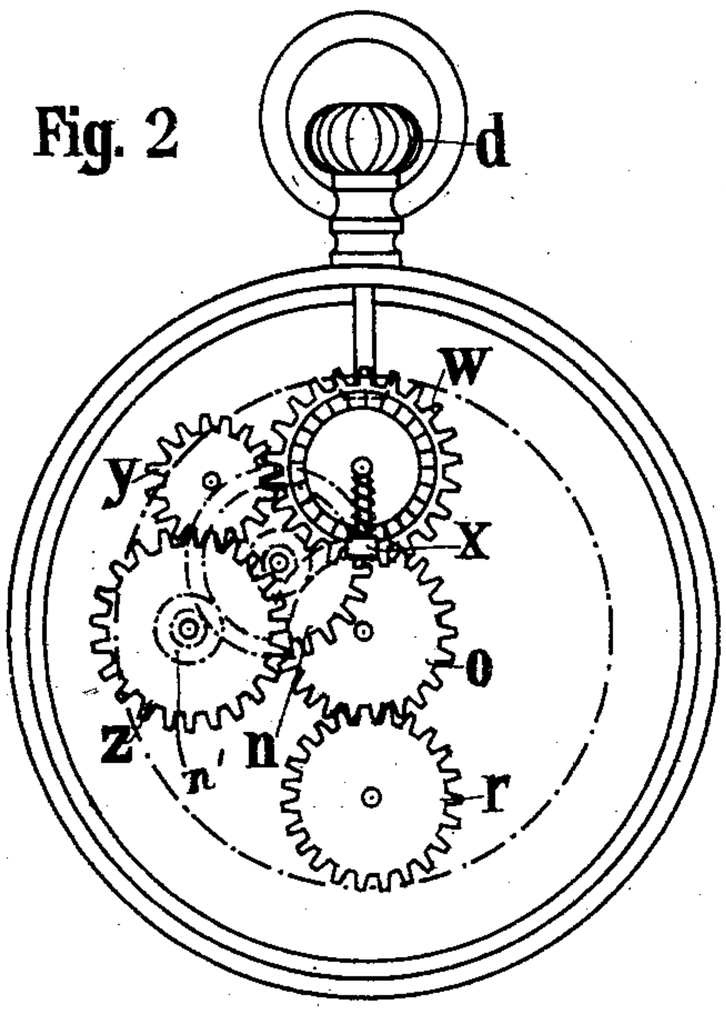


Fig. 2



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5 SHEETS—SHEET 2.

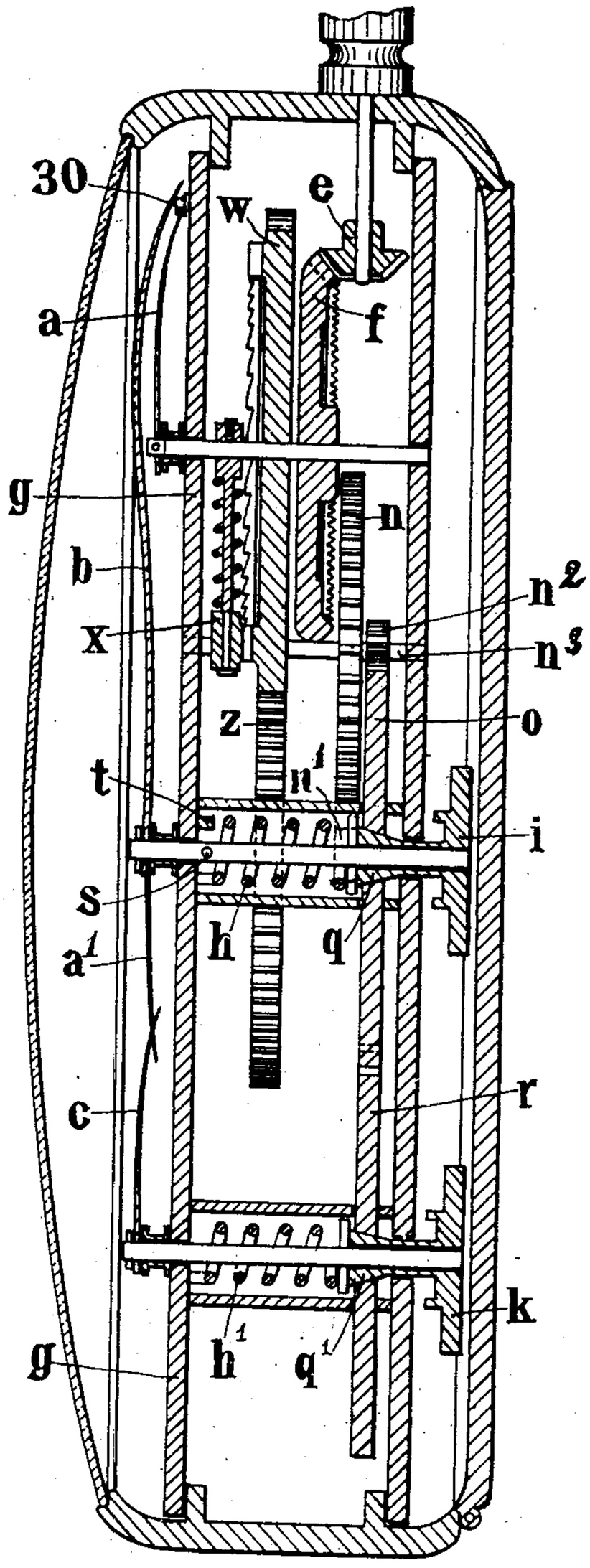

Fig. 3

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5 SHEETS—SHEET 3.

Fig. 4.

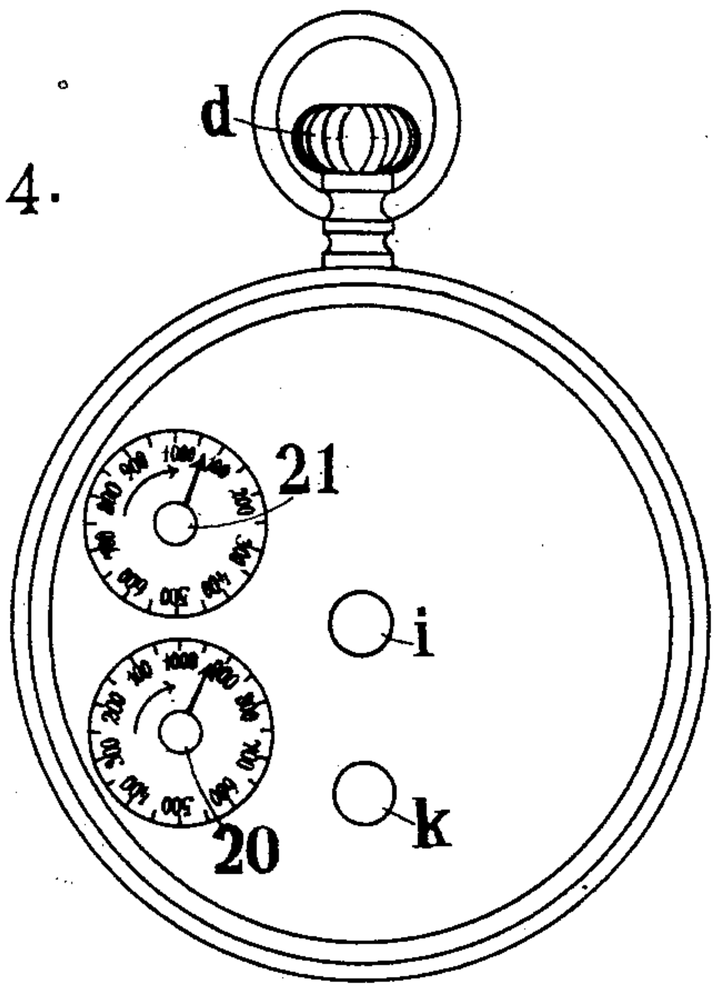
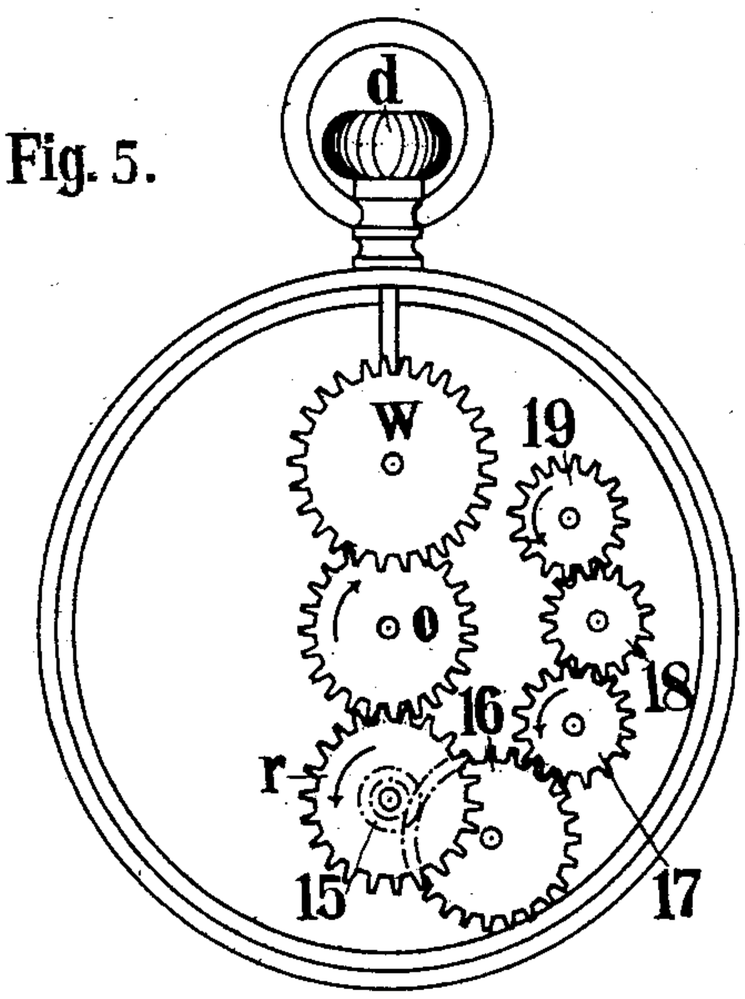


Fig. 5.



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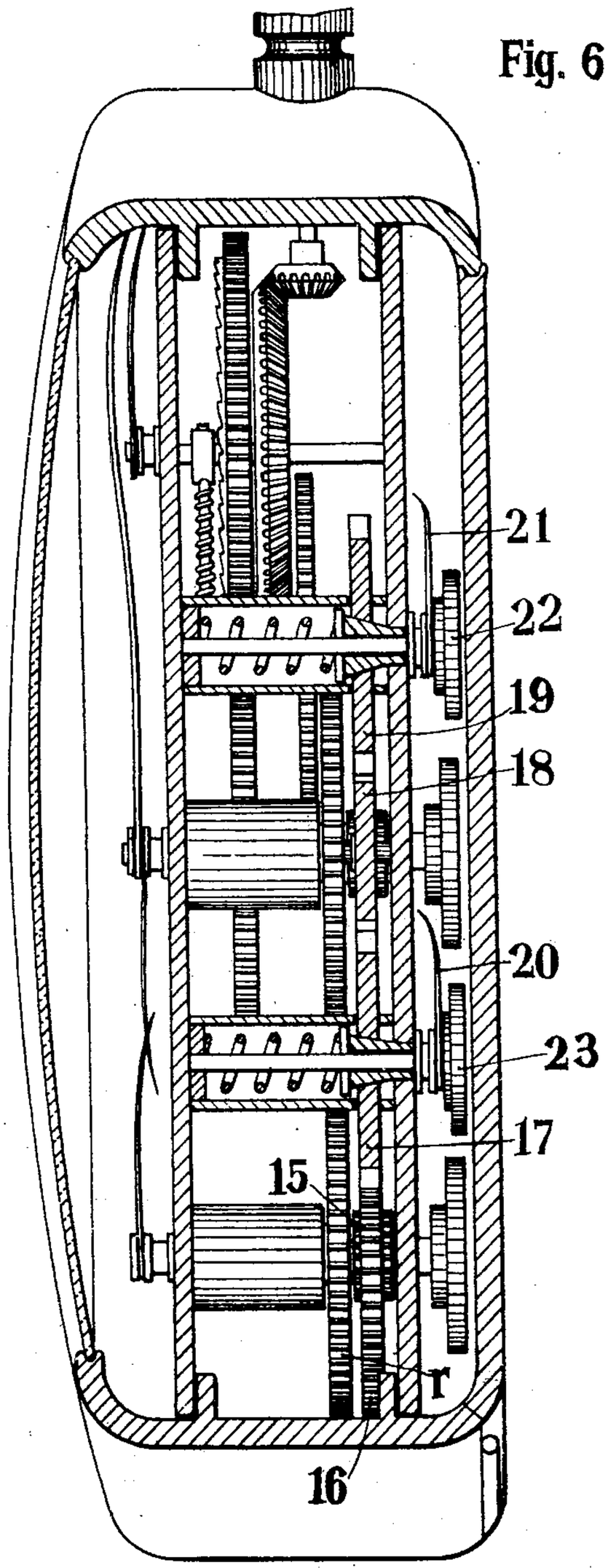
5 SHEETS—SHEET 4.

Fig. 6



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5 SHEETS—SHEET 5.

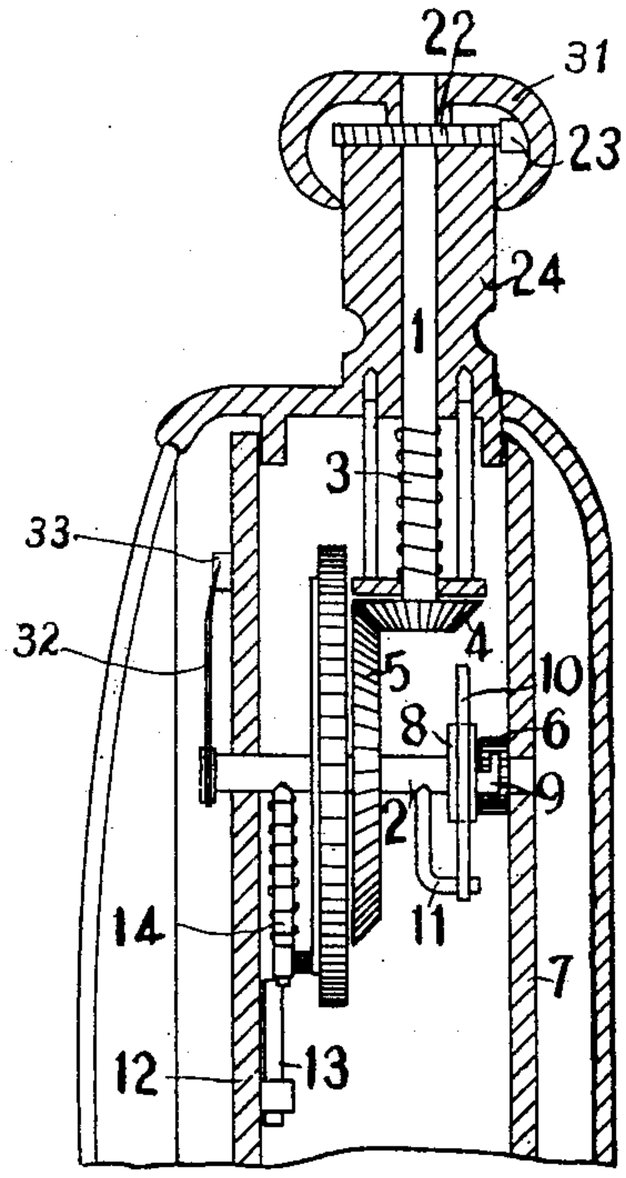
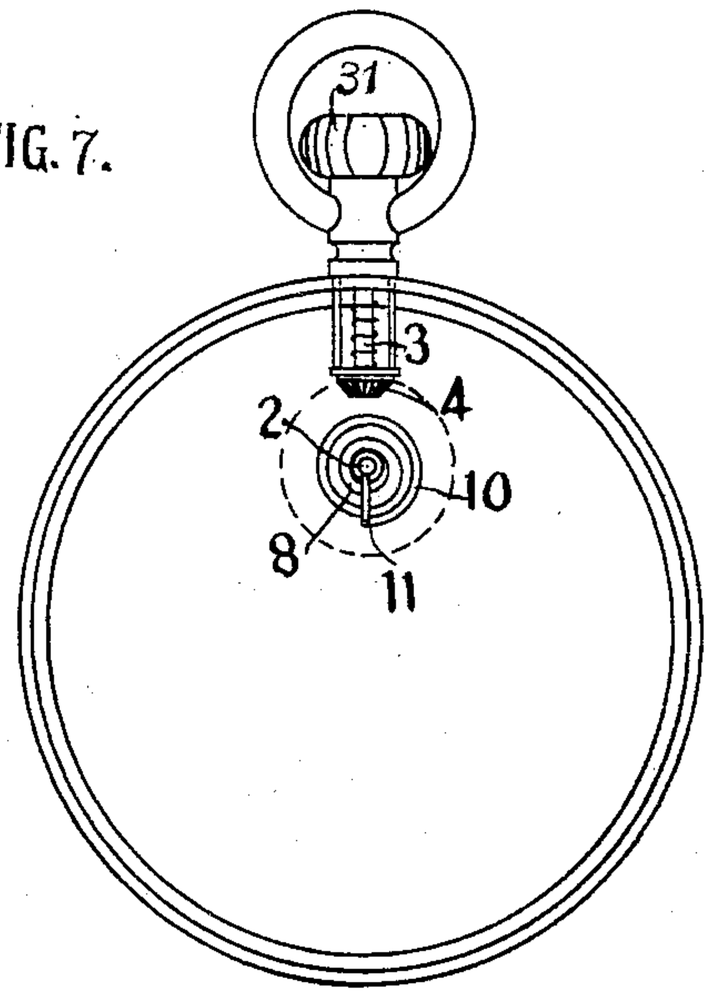


FIG. 8.

FIG. 7.



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UNITED STATES PATENT OFFICE.

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EXPENSE-REGISTER.

No. 919,587. Specification of Letters Patent. Patented April 27, 1909.

Application filed November 1, 1906. Serial No. 341,530.

To all whom it may concern:

Be it known that I, SVERRE JOHNSEN, a subject of the Emperor of Germany, and a resident of Bergedorf, near Hamburg, Germany, have invented certain new and useful Improvements in Expense-Registers, of which the following is a specification.

This invention has reference to a novel expense register.

It is the special object of my invention to produce such a device for registering daily expenses, adding same up, and indicating the remaining cash on hand. Each expenditure is registered in a simple and inconspicuous manner. The single items are simultaneously added up and the remaining cash is indicated. By observing the remaining cash one is cautioned against careless expense and learns to economize.

The invention is illustrated in the accompanying drawing in which:

Figure 1 represents in front view an expense register which embodies in desirable form the present improvements. Fig. 2 shows same with the glass and dial removed. Fig. 3 illustrates same on an enlarged scale in vertical section at a right angle to Fig. 2. Fig. 4 shows a modified form of the device in rear view with the rear cover removed which is adapted to register larger amounts. Fig. 5 is a rear view of the mechanism of the modified form shown in Fig. 4 with the rear cover and rear dial plate removed. Fig. 6 is a vertical cross section at right angles to Fig. 5 on an enlarged scale. Fig. 7 illustrates a detail view in front elevation. Fig. 8 shows in vertical section the top portion of the device shown in Fig. 7 on an enlarged scale and at a right angle thereto.

The device is preferably made in the form of a watch. It is provided with four hands a, a^1, b, and c, which move on a dial g. The hands are moved by means of a stem winder knob d in the following manner: The knob d is in rigid connection with a bevel gear e. This gear engages with a bevel gear f which is mounted on the spindle of the hand a, see Fig. 3. To the spindle of the hand a is also rigidly connected a pawl x adapted to engage the lateral teeth of a wheel w which fits loosely on the spindle of the hand a and has both spur and lateral teeth. The pawl x will move the wheel w only when the hand a and said pawl turn in the direction of making an addition. By means of suitable intermediate gearing y, see Fig. 2, the rotation of the wheel w, when effected in the direction of making addition only, is transmitted to a spur gear z which will turn the hand a^1 each time to add the expended sum. By turning the knob d backward, the hand a is turned to its zero position after one expenditure has been registered without affecting the hand a^1. A suitable stop 30, say a flat spring, may be provided which will prevent the hand a from being moved backward beyond the zero position, but will not offer any resistance to the hand when moved forward.

A wheel n^1 on the spindle of the hand a^1 engages a gear wheel n. The gear wheel n and a gear wheel n^2 are rigidly mounted on the spindle n^3. The gear wheel n^2 engages a third gear wheel o which is loosely mounted on the spindle of the hand b. The gear wheel o is moved by the operation of the spindle of the hand a^1 through wheel n^1, the gears n and n^2 at a ratio of, say 1 to 50 thus proportionally transmitting the movement of the spindle of the hand a^1 to the spindle of the hand b. At the shown graduation of the dial for the hands a and a^1 in hundred parts and that of the hand b in fifty parts the hand a^1 will indicate the cents (pfennige) and the hand b the dollars (mark) of the sum expended when the hand a after each operation has been returned to zero. At a ratio of one to one the gear wheel o drives a gear wheel r which is mounted on the spindle of the hand c so that when the gear r and the hand c are coupled, the hand c will move backward over a dial and perform a subtractive operation. If now the hand c is set to indicate the sum on hand and the hand a moved by means of the knob d after each expenditure such a distance on its scale as corresponds to the amount expended, the hand c will indicate the cash remaining on hand and a correct and clear reading of the expenses is afforded, indicated by the hand b in dollars (mark) and by the hand a^1 in cents (pfennige). By turning the knob the expenditure only can be registered, a turning of the knob in the opposite direction remains without effect owing to the action of the pawl x and the gear mechanism. Sometimes, however, it is of importance to move the hand c without moving the mechanism, when for instance the cash on hand is to be increased. In order to do this and also effect the adjustment for expenditure without unnecessary and time wasting turning of the knob d, the couplings

shown in Fig. 3 on an enlarged scale are provided. By means of said couplings the gears *o* and *r* may be connected with or disconnected from the respective spindles as may be required. Such friction couplings between a hand and a driving wheel are already known to the art. The present invention consists in the registering mechanism of single expenditures, the adding of same, and the registering of the remaining cash on hand.

The coupling of the wheel *o* consists essentially of the device shown in the drawing. A split cone *q* which is connected with the press knob *i* is forced into the conical bore of the wheel *o* by a spring *h*. The split cone *q* having a cylindrical bore inside grips the spindle of the hand *b* so tightly that the wheel *o* when turned in the direction of the arrow shown on Fig. 1 will move the hand *b* steadily and accurately whereby the spring *h* is tightened, it being secured with one end to the dial or some other stationary part of the case and with the other end to the spindle of the hand *b*. However, if the knob *i* is pressed, the cone *q* will leave the conical bore of the gear *o* and the said cone *q* releases the spindle of the hand *d* and the spindle and hand will be returned into the zero position of the hand *b* by action of the spring *h*. Stops *s* and *t* are provided to prevent that the hand be returned farther than to the zero position.

The gearing mechanism and hand *c* remain stationary owing to the friction between the wheels. The hand *c* also may be adjusted independently by a knob *k* after the coupling *q* on the spindle of the hand *b* has been disconnected. In order to move the hand *c* independently, it is necessary to press the knob *i* for disconnecting the coupling *q* and at the same time turn the knob *k*. It is also possible to avoid this operation and to adjust the hand *c* only by pressing and turning the knob *k*. While the knobs *k* and *i* are suitably arranged as shown underneath the cover of the case, the knob *d* is made to project from same.

In the device illustrated in Fig. 1 the dials are graduated for cash and expenditures up to an amount of fifty dollars (mark). In order to render the instrument useful for business purposes and large amounts, the scales on the dials shown in Fig. 4 are graduated up to a thousand dollars (mark); such dials are suitably arranged on the back and under the cover of the device because they run up to a thousand dollars and therefore are rarely used. Furthermore the dials and the mechanism pertaining thereto would crowd the front portion of the watch too much.

A modification of such character is shown in Figs. 4, 5, and 6. The mechanism of this device is the same as above described, but is complemented by additional parts. Under the wheel *r* of the first described device is located a wheel 15 which engages with an intermediate gear 16 driving a gear wheel 17 on the spindle of the hand 20 which indicates the remaining cash. By the intermediate gear wheel 18 a gear 19 is driven which is mounted on the spindle of the hand 21 which indicates the expenditure made. In order to render it possible to move those hands independently as may be required when the cash on hand is to be increased, the wheels 17 and 19 are connected to their spindles by means of couplings, which are to be disengaged by pressing the knobs 22 and 23 shown in Fig. 6.

A further improvement of the above invention relates to its expenditure registering device and consists in turning the counting mechanism automatically to the zero position. This improvement differs from those heretofore known in which the hands or dials were turned by means of springs into their initial position. In the present device an adjusting knob is displaced by pulling whereby certain gears are disconnected and the main and hand spindles being under spring action are returned into their initial position. The device for carrying this into practice is shown in Figs. 7 and 8.

On the driving spindle 1 a spring 3 is provided which continuously presses the bevel wheel 4 against the bevel wheel 5 which latter is mounted on the spindle 2. At the end of the spindle 2 a ratched wheel 6 is provided which is secured to a plate 7. On this plate 7 a disk 8 is loosely arranged. This disk has on its inner side a pawl 9 which engages with the teeth of the ratched wheel 6. Around the disk 8 is arranged a spiral spring 10 which is secured with one end to said disk and with the other to a dog 11 on the spindle 2. If now the spindle 2 is turned forward by means of the knob 31 the spring 10 is tightened because it is secured with one end to the dog 11 and held with the other end by the pawl 9 catching in the ratched wheel 6 which is rigidly secured to the plate 7 of the case. The pawl 9 serves the purpose of avoiding an undue strain on the spring 10 and is indirectly connected with this spring by the disk 8. The spring thus tightened follows the rotation of the disk 6. If now a slight pull is exerted on the knob 31 the spindle 2 and with it the coupling of the bevel wheels 4, 5 are released and the spindle 2 will instantly turn backward until it is stopped by the hand 32 which strikes against the stop 33 provided on the zero point. It will further be found of advantage if each complete revolution of the hand 32 equaling one dollar (mark) is made audible. This is of value when the expended amounts run into high figures. A device of this kind renders it unnecessary to pay close attention to the dial which be-

comes annoying by the repeated turning of the knob 31 when a number of dollars or marks are at once expended. A steel lip 13 is secured to the top cover which will give an audible sound each time an arm 14 strikes against it.

Having thus described my invention I claim as new and desire to secure by Letters Patent:

1. An expense register comprising mechanism to indicate the amount of cash on hand, means to register each single expenditure, means for adding up the single items, intermediate means connecting both to effect such addition, a device to operate the mechanism indicating the amount of cash on hand so that each single expenditure is subtracted, intermediate couplings to effect such subtraction, and a signal device adapted to be operated to issue an audible sound when a unit of coin has been expended.

2. An expense register comprising a hand operated mechanism, a dial, a graduation thereon with a hand indicating the total cash on hand, a second graduation on said dial with a hand registering each single expenditure, a third graduation on said dial with a hand showing the addition of single expenditures in cents, and a fourth graduation thereon with hand indicating the addition in dollars, intermediate means to effect the addition, and intermediate couplings to effect the subtraction of the single expenditures on the first named graduation for the purpose of showing the remaining cash on hand.

3. An expense register comprising a hand operated mechanism, a dial, a graduation thereon with a hand indicating the total amount of cash, a second graduation on said dial with a hand registering each single expenditure, a third graduation on said dial with a hand showing the single expenditure in cents, and a fourth graduation indicating the addition in dollars, intermediate means to effect the addition, intermediate couplings to effect the subtraction of the single expenditures on the first named graduation to show the remaining cash on hand, and a coupling for connecting the single item indicator with subtraction device so that the hands may be independently set.

4. An expense register comprising a hand operated mechanism of gears and spindles, hands on said spindles, a dial with graduation below the hands, intermediate means to effect the addition of the single items in cents and dollars, a coupling between the spindle of the dollar hand and a driving wheel of the device for registering the single expenditures adapted to be disconnected, means for returning the dollar hand to its starting point after said coupling has been disconnected, intermediate gearing to effect the subtraction of the single expenditures for the purpose of showing the remaining amount on one of the graduations, and a coupling for connecting the single item indicator with the subtraction device so that the hands may be independently set.

5. An expense register comprising a hand operated mechanism of gears and spindles, hands on said spindles, a dial with graduations below the hands, intermediate means to effect the addition of the single items in cents and dollars, a coupling between the spindle of the dollar hand and the driving wheel of the device for registering the single expenditures adapted to be disconnected, means for returning the dollar hand to its starting point after said coupling has been disconnected intermediate gearing to effect the subtraction of the single expenditures for the purpose of showing the remaining amount on one of the graduations, a coupling between the spindle of the hand indicating the subtraction and the driving wheel of its mechanism, a device for returning the hand indicating the subtraction to its starting point after the said coupling has been disconnected, and a coupling for connecting the single item indicator with the subtraction device.

6. An expense register comprising a hand operated mechanism of gears and spindles, hands on said spindles, a dial with graduations below the hands, intermediate gearing to effect the addition of the single items in cents and dollars, devices for preventing the adding and subtracting mechanisms from being moved backward during the returning of the single item indicator to its starting point, intermediate gearing to effect the subtraction of the single expenditures for the purpose of showing the remaining amount on one of the graduations, and couplings for setting each hand independently.

Signed at Hamburg this 17th day of October 1906.

SVERRE JOHNSEN.

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