(No Model.) 2 Sheets—Sheet 1.

E. M. ROSENTHAL.

CALCULATING MACHINE.

No. 401,463. Patented Apr. 16, 1889.

Fig. 1.

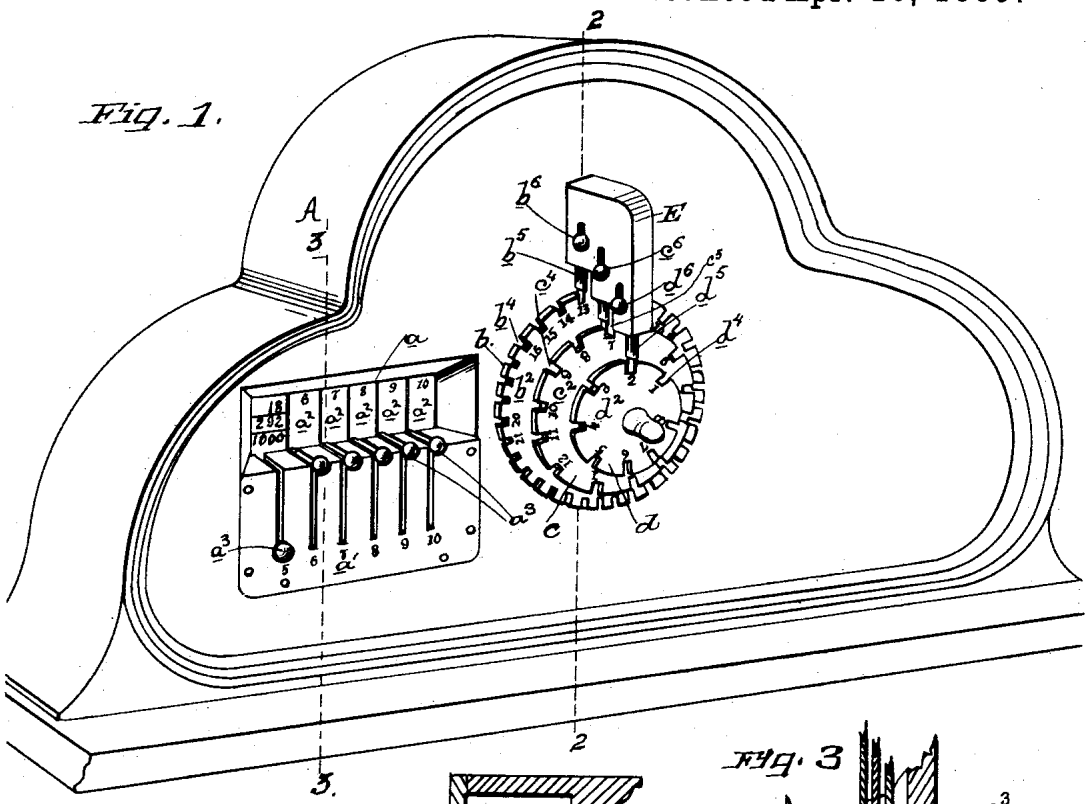


Fig. 2.

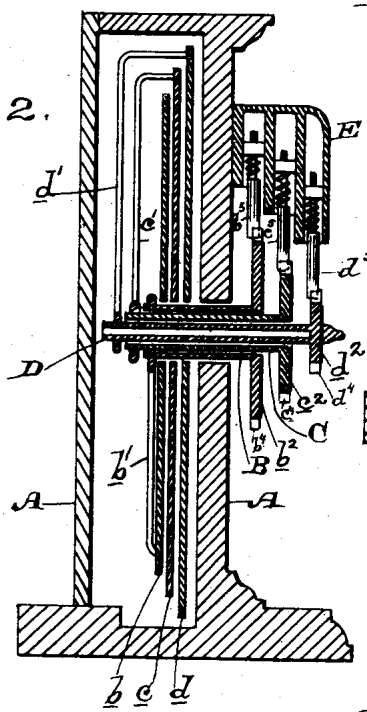
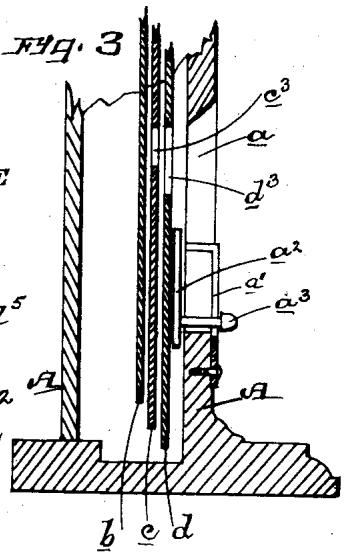


Fig. 3



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(No Model.) 2 Sheets—Sheet 2.

E. M. ROSENTHAL.

CALCULATING MACHINE.

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Fig. 4.

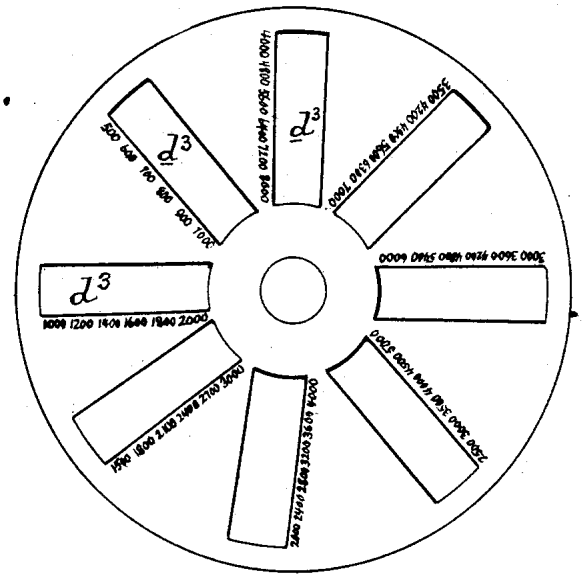
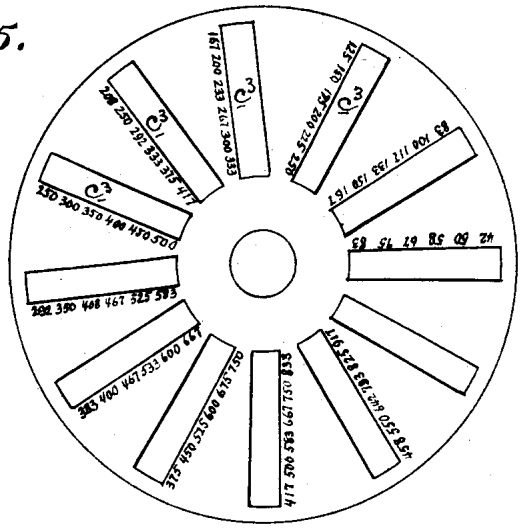


Fig. 5.



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UNITED STATES PATENT OFFICE.

EUGENE M. ROSENTHAL, OF SAN JOSÉ, CALIFORNIA.

CALCULATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 401,463, dated April 16, 1889.

Application filed December 22, 1888. Serial No. 294,388. (No model.)

To all whom it may concern:

Be it known that I, EUGENE M. ROSENTHAL, of San José, Santa Clara county, State of California, have invented an Improvement in Calculating-Machines; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of calculating-machines; and my invention consists in the devices and combination of parts hereinafter fully described, and specially pointed out in the claims.

The object of my invention is to provide a simple and effective machine for making calculations of all kinds, and especially for the calculation of interest.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a perspective view of my calculator. Fig. 2 is a vertical section on line 2 2 of Fig. 1. Fig. 3 is a partial section on line 3 3 of Fig. 1. Fig. 4 is an elevation of dial-plate *d*. Fig. 5 is an elevation of dial-plate *c*.

A is the case of the machine. Through the front wall or face of the case passes a sleeve, B, which carries on its inner end a dial-plate, *b*, connected with it by an arm, *b'*. On its outer end it has a thumb-wheel, b^2.

C is a second sleeve passing through the first and carrying upon its inner end a dial-plate, *c*, which lies closer to the face of the case than the dial-plate *b*, and said dial-plate *c* is connected with the sleeve C by an arm, *c'*, the end of which is bent over and forwardly past the rim of the dial-plate *b*. On the outer end of the sleeve C is a thumb-wheel c^2.

D is a third sleeve, which passes through the sleeve C, and carries upon it, within the case, a dial-plate, *d*, which lies nearest the face of the case, and is connected with the end of the sleeve D by an arm, *d'*, the end of which is bent past the rims of the other dial-plates. On the outer end of the sleeve D is a thumb-wheel, d^2.

It will thus be seen that by this arrangement the dial-plates and the thumb-wheels preserve the same relative position or order outside and inside of the case. Their relative diameters, however, are reversed—that is to say, the thumb-wheel b^2 has a larger diameter than the thumb-wheel c^2, which itself is larger in diameter than the thumb-wheel d^2, while the dial-plate *b* is smaller in diameter than the dial-plate *c*, which is itself smaller in diameter than the dial-plate *d*. This arrangement of the relative diameters of the dial-plates provides for the proper attachment of each to its sleeve by means of the arms *b'*, *c'*, and *d'*, and the effect of the whole construction is to render each dial-plate separately rotatable by means of the thumb-wheels on the front and to provide for the arrangement of the various figures upon the dials so as not to interfere with the exhibition of each set, as I shall hereinafter more fully describe.

In the face of the case A is made a sight-aperture, *a*, through which the faces of the dials may be seen, and these dials, in order not to interfere with the proper exhibition of the numbers upon each, are cut out as follows: The dial-plate *d* has openings d^3 cut in its outer portion at stated distances apart. The dial-plate *c* has openings c^3 at more frequent intervals than the openings of the dial-plate *d* and smaller, while the dial-plate *b* is not cut out at all, whereby the result is effected of being able to see through the openings d^3 a portion of the dial-plate *c*, and through the openings c^3 the face of the dial-plate *b*, all this being seen through the sight-aperture *a* in the case.

Upon the dial-plate *d* is made a row of numbers. A row of numbers is also made on the plate *c*, and a row of numbers is also made upon the plate *b*, the numbers on the plates *b* and *c* being made just below the apertures in each. Now, by turning any one of the thumb-wheels the figures of the proper dial-plate may be brought into view through the opening *a*, and by manipulating each of the thumb-wheels any combination of figures on the several dial-plates may be brought into position together and be exhibited through the aperture *a*.

Secured to the front or face of the case A, directly under the sight-aperture *a*, is a slotted guide-plate, *a'*, in which is mounted a series of independent slides, a^2, each of which is operated by a projecting knob, a^3. These slides have a width sufficient and are adapted to conceal separate numbers of the rows of numbers on the faces of the dial-plates, and as

these slides are separately movable but one need be moved down at a time, thereby exhibiting only a single vertical row of figures on the three dial-plates, and thus avoid any mistake likely to follow from the confusion of so many numbers as would otherwise be exhibited through the sight-aperture.

Each of the thumb-wheels b^2, c^2, and d^2 is provided on its rim with notches b^4 c^4 d^4, respectively, and with these notches engage the pawls b^5 c^5 d^5, said pawls being mounted in a guide, E, above and operated by projecting knobs b^6 c^6 d^6.

In the present machine, which is particularly designed for an interest-calculator, the smallest thumb-wheel—viz., d^2—is the year-wheel, and is provided with notches numbered consecutively, as shown. The next largest wheel, c^2, is the month-wheel, and is provided with twelve notches numbered consecutively. The largest wheel, b^2, is the day-wheel, and is provided with thirty-one notches consecutively numbered.

As an interest-calculator the numbers on the dial-plates are previously figured out—say, for example, on a basis of one hundred dollars. The numbers are arranged on the dial-plates in concentric rows. The outermost number of each row of dial-plate d represents the interest on one hundred dollars for a given number of years at a given per cent.—say at five per cent. The next number of each row represents the interest for a given number of years on one hundred dollars at six per cent., and so on throughout the rows of plate d. In like manner the figures on the dial-plate c represent the interest on one hundred dollars at given percentages for a given number of months, and the figures upon the dial-plate b represent the interest on one hundred dollars at different percentages for a given number of days. The slides a^2 are suitably numbered, as shown, and represent the rates per cent., and these slides conceal the figures on each dial-plate representing the percentages at these several rates, respectively.

The operation of the device will be best understood by the following example: What is the interest on one hundred and fifty-five dollars and fifty-five cents for two years, seven months, and thirteen days at five per cent. per annum? First, raise the pawl d^5, then turn the thumb-wheel d^2 around to bring its No. 2 notch under the pawl, whereupon drop the pawl into the notch, thereby holding the wheel. This represents the two years. Now raise the pawl c^5, and turn the thumb-wheel c^2 around to the 7 notch, and drop the pawl into it, thereby holding the wheel, and this represents the seven months. Then raise the pawl b^5 and turn the thumb-wheel b^2 around to the 13 notch, and drop the pawl into it, thereby holding the wheel, and this represents the thirteen days. Thereupon push down that slide of the series a^2 which is numbered 5 and which represents five per cent., thereby exposing a vertical row of figures on the three dial-plates. The figures on the dial-plate d are 1,000, on the dial-plate c they are 292, and on the dial-plate b they are 18. These I add together, making 1,310. Now multiply 155.15 by 1,310, which gives a result, after pointing off the proper decimals, of $20.32, which is the answer. It will thus be seen that by turning the proper thumb-wheels to the proper notches representing the given time for which interest is to be computed, and then dropping the proper slide representing the given rates per cent., the dial-numbers will be exhibited, which, when added, give a multiplier for the principal, thus giving the proper interest.

As many rows of numbers as may be desirable may be made upon the dial-plates, and as many slides corresponding to these numbers may be made representing the different rates of interest. The machine is also applicable to the calculation of matters other than interest, but which need no detailed description.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a calculating-machine, independent and separately-rotatable dial-plates provided with suitable numbers previously calculated, said plates being located one behind the other and having suitable openings, d^3, so that the numbers may be seen through said openings, in combination with independent slides on the faces of the case for exposing and concealing the numbers on the dials, substantially as described.

2. In a calculating-machine, and in combination with a case having a sight-aperture in its face, independent and separately-rotatable dial-plates within said case and having a series of numbers thereon adapted by the movement of said plates to be brought into position behind the sight-aperture of the case, said plates having openings through which the numbers on the plates may be seen through the sight-aperture, and vertical slides for exposing and concealing the numbers, substantially as herein described.

3. In a calculating-machine, and in combination with a case having a sight-aperture in its face, the independent and separately-rotatable dial-plates within the case, having the concentric series of previously-calculated numbers upon them, adapted to be brought into position behind the sight-aperture of the case, said plates having openings through which the numbers can be seen, and the independent slides a^2 on the face of the case and controlling its sight-aperture for exposing and concealing the different numbers of the concentric series on the dial-plates, substantially as herein described.

4. In a calculating-machine, the case A, having a sight-aperture in its face, in combination with the independent dial-plates within

the case and having the previously-calculated numbers thereon and openings through which they may be seen, the concentric sleeves passing through the face of the case and each carrying a dial-plate, the separate thumb-wheels on the outer ends of the sleeves, whereby the dial-plates may be separately moved, and the independent slides a^2, controlling different portions of the sight-aperture and exposing and concealing the different numbers on the dial-plates, substantially as herein described.

5. In a calculating-machine, the case A, having a sight-aperture in its face, in combination with the independent dial-plates within the case and having the previously-calculated numbers upon them and openings by which the figures on the dial-plates may be seen through the sight-aperture, the concentric sleeves passing through the face of the case and each carrying a dial-plate, the independent thumb-wheels on the outer end of the sleeves, each thumb-wheel having notches, and the vertically-moving spring-actuated pawls over the thumb-wheels engaging the notches therein and controlling said wheels, substantially as herein described.

6. A calculating-machine consisting of the combination of the case A, having a sight-aperture, a, in its face, the independent dial-plates within the case and having the numbers thereon and openings through which the numbers may be seen through the sight-aperture, the concentric sleeves carrying the dial-plates, the notched and independent thumb-wheels on the outer ends of the sleeves for rotating the dial-plates, the pawls controlling the thumb-wheels, and the independent separate slides a^2, controlling the sight-aperture and exposing and concealing the numbers on the dial-plates, all arranged and adapted to operate substantially as herein described.

In witness whereof I have hereunto set my hand.

EUGENE M. ROSENTHAL.

Witnesses:
C. J. OWEN,
H. J. ALEXANDER.