T. J. DALZELL.

CALCULATING DEVICE.

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1,397,944.

Patented Nov. 22, 1921.

Fig. 1.

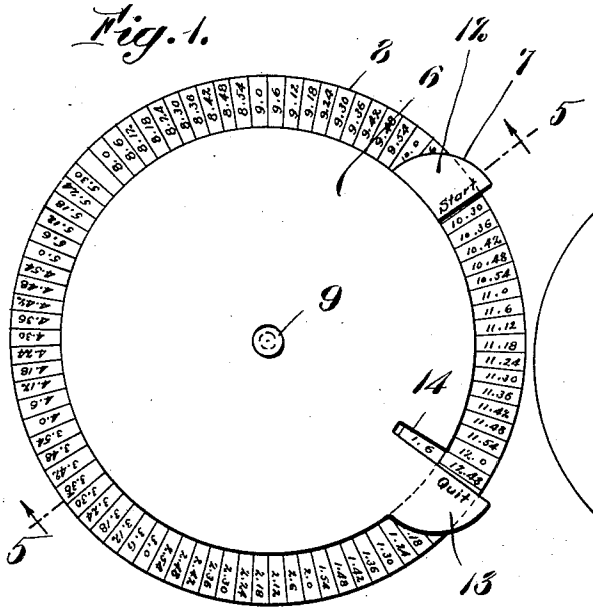


Fig. 2.

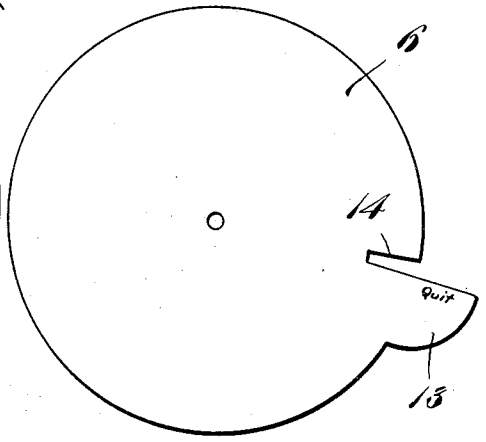


Fig. 3.

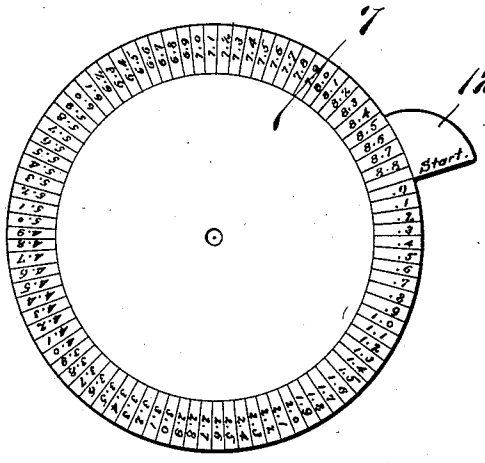


Fig. 4.

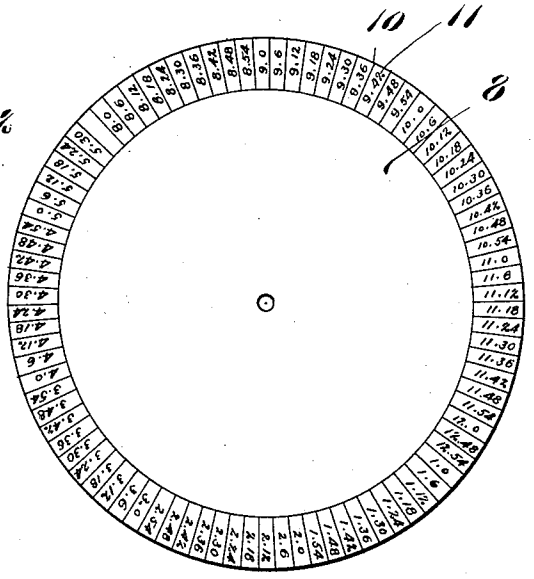
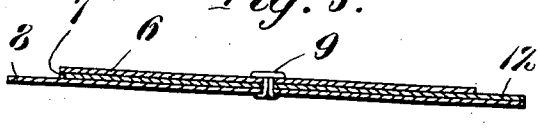


Fig. 5.



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UNITED STATES PATENT OFFICE.

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CALCULATING DEVICE.

1,397,944. Specification of Letters Patent. Patented Nov. 22, 1921.

Application filed April 22, 1920. Serial No. 375,694.

To all whom it may concern:

Be it known that I, THOMAS J. DALZELL, citizen of the United States of America, and resident of Wakefield, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Calculating Devices, of which the following is a specification.

This invention relates to a calculating device and more particularly to a device for that purpose of the kind having a plurality of relatively movable disks carrying suitable scales on their margins.

In certain business offices it is frequently necessary to determine figures or amounts which are the result of the combination of several variables, as for example in connection with pay rolls where the amount depends upon the rate of wages and the time of starting and stopping work, or in connection with securities, investments or other business transactions where the variables will be the period or time and the rate of interest.

A very general method used in such cases consists in the utilization of tables, the variables being represented by the abscissæ and the ordinates. In such methods there is always the danger that the user will inadvertently slip into the wrong column or the wrong line with consequent error as a result. Such tables are, moreover, bulky and inconvenient to use.

It is an object of the present invention to provide a simple and compact device for readily and quickly computing results dependent upon variables. It is also an object to provide a device of the character described so formed as to substantially eliminate danger of mistake in its use with consequent erroneous determination. It is a further object to provide a computing device which is relatively inexpensive to manufacture and yet durable in construction. Other and further objects will appear as the disclosure proceeds.

I have illustrated a preferred embodiment of my device in the accompanying drawings, in which,

Figure 1 is a plan view of my device;

Fig. 2 is a plan view of the upper or top member;

Fig. 3 is a plan view of the intermediate member;

Fig. 4 is a plan view of the base member; and

Fig. 5 is a cross section on line 5—5 of Fig. 1.

My device consists of three disks, the upper member 6, intermediate member 7, and base member 8, all of which are centrally perforated and joined by a rivet or similar fastener 9 which forms their common axis.

The base member is of greater diameter than the other members and its margin is divided by radial lines 10 forming a scale upon which numerals are placed. In the example shown these numerals represent time, and run continuously from 8.0 to 5.30, the interval between successive numerals being six minutes with the exception of a period from 12:0 to 12:48 corresponding substantially to the noon period when, because of a lunch period, here taken arbitrarily as 42 minutes, the actual time from 12:0 to 12:48 corresponds to six working minutes and the calculator is, of course, only intended to include working time during which pay is earned.

The margin of the intermediate member 7 is similarly divided into a scale by radial lines corresponding to its scale lines on the base member. This scale is also supplied with numerals, and as shown these numerals are in terms of wages at the rate of $1.00 per hour. The intervals correspond to those of the outer scale and represent the amount of pay, for periods differing by six minutes. Since six minutes is one tenth part of an hour, here, the numerals differ by the tenth part of one dollar which is the pay per hour. Integral with the intermediate member and extending radially beyond its margin is the index or pointer 12, which, as shown, has the word "Start" written thereon.

The top member 6 carries no scale numerals, but has extending therefrom the index or pointer 13 which has the word "Quit" or a word of similar import written thereon. Adjacent the straight edge of this index or pointer and extending above it into the margin of the disk is the reading window 14 which has an area equal to that of one of the scale sections on the intermediate member.

In use the three members are assembled as shown in Figs. 1 and 5. Taking the example shown in Fig. 1, a workman started to work at 10:30 and the "Start" index 12, that on the intermediate member, is there-

fore moved around above until its straight edge rests on the scale line adjacent 10:30 on its base member. The work was stopped at 12:48 and the "Quit" index 13 is therefore moved until its straight edge is just below below 12:48. The amount of pay due at the rate of $1.00 per hour of $1.60 now appears through the reading window 14. In this case 1.6 also indicates the amount of time worked or one and six tenths hours. This is correct since the period from 10:30 to 12:0 is one and five tenths hours, and as has been stated above, six minutes or one tenth of an hour of work time elapsed between 12:0 and 12:48.

Similarly any other period of labor and consequent amount of pay may be readily ascertained by placing the "Start" index above the time of starting and the "Quit" index below the time of quitting, and reading the figures appearing in the reading window. The indices are formed with their reading edges straight and their opposite edges curved so that all danger of using the wrong edge of the index is eliminated. The reading window is directly opposite and immediately adjacent the last figure to be set, which greatly facilitates rapidity of reading. The two indices are reversed as regards their reading edges so that no portion of the time interval included between the readings is covered by an index which further makes for ease in use. The reading window exposes a single figure only which is that of the correct result, all other figures being covered by the top member, so that after the device is set, it is impossible to read any result other than the correct one.

Obviously the specific sets of figures shown in the drawings are to be considered as illustrative only. When used to calculate time of work, or amount of pay the outer scale may be made to include any hours desired with any noon rest period desired, and the inner scale may be at any rate of pay desired. While here the outer scale shows portions of a day, it may obviously be divided into portions of weeks, months or years when pay is computed on those bases. The device is also applicable to the computation of the amount to be charged to any particular job or piece of work in cost accounting, or where work is to be charged for by the amount of time spent upon it. As has been stated, our device is also adapted for use in computing interest on funds or investments, and it is in fact broadly applicable to any use wherein a result is desired which is dependent upon two variable factors, the scales used depending upon the particular use to which it is to be put.

I claim:

1. A calculating device comprising three superposed disks, pivotal means connecting said disks for relative rotation, the lower disk having an exposed scale and the middle disk also having a scale, said upper disk overlapping the scale of the middle disk and having a narrow radial slot forming a window for exposing a limited portion of the middle disk, and a tab projecting integrally from the edge of the upper disk and having a reading edge alining with an edge of said slot.

2. A calculating device comprising three superposed relatively rotatable disks, the lowermost thereof being of a diameter greater than that of the two upper disks, the exposed edge portion of the lowermost disk being provided with an indexed scale, the middle disk also having an indexed scale upon its upper surface adjacent its edge, and an integral tab projecting from the edge of said middle disk and overlapping the scale of the lowermost disk, said tab having a curved edge and a radial reading edge, an integral tab projecting from the edge of the upper disk, said tab having a curved edge and a radial reading edge, the reading edges of said tabs being normally opposed to each other, said upper disk having a radial slot forming a reading window for exposing the graduations of the scale of the middle disk, one edge of said slot alining with the reading edge of the tab of the top disk, each of said tabs being provided with indicia useful in setting the said upper and middle disks.

3. A calculating device comprising a circular base member having a scale adjacent its periphery, a circular intermediate member of a size adapted when placed upon the base member to expose the scale thereon, the intermediate member having a scale adjacent the periphery, divisions of the scale corresponding in size to those on the base member, the variations between successive indicia on the two scales bearing a fixed ratio, an index pointer extending radially from said intermediate member beyond said base member for use with the scale on the base member, a top member substantially equal in size to the intermediate member and having a reading window equal in size to one of the divisions of the scale on the intermediate member, the remainder of the scale being covered by the top member, and an index pointer extending from said member beyond the base for use in reading the scale on the base member.

4. A calculating device comprising a circular base member having a scale adjacent its periphery, a circular intermediate member of a size adapted when placed upon the base member to expose the scale thereon, the intermediate member having a scale adjacent its periphery, divisions of the scale corresponding in size to those on the base member, the variation between successive indicia on the two scales bearing a fixed ratio, an index extending radially from said inter-

mediate member outside the periphery of the base for use with the scale on the base member, a top member substantially equal in size to the intermediate member and having a reading window equal in size to one of the divisions of the scale on the intermediate member, the remainder of the scale being covered by the top member, and an index extending from said member outside the periphery of the base for use in reading the scale on the base member, each of said two indices having a curved side and a straight side, and facing in opposite directions, whereby the straight sides are adapted to aline with opposite sides of the scale divisions on the base, and the window in the top member being immediately adjacent the straight edge of the index thereof.

5. A calculating device comprising a circular base member having a scale adjacent its periphery, a circular intermediate member of a size adapted when placed upon the base member to expose the scale thereon, the intermediate member having a scale adjacent the periphery, divisions of the scale corresponding in size to those on the base member, the variation between successive, numerals on the two scales bearing a fixed ratio, an index pointer extending radially from said intermediate member beyond the periphery of the base for use with the scale on the base member, a top member substantially equal in size to the intermediate member and having a reading window equal in size to one of the divisions of the scale on the intermediate member, the remainder of the scale being covered by the top member, and an index pointer extending radially from said top member beyond the periphery of the base for use in reading the scale on the base member, each of said two index pointers having a straight side and facing in opposite directions, whereby the straight sides of the respective pointers are adapted to aline with opposite sides of the scale divisions on the base and the window in the top member being immediately adjacent the straight edge of the index pointer thereof.

Signed by me at Boston, Massachusetts, this 20th day of April, 1920.

THOMAS J. DALZELL.