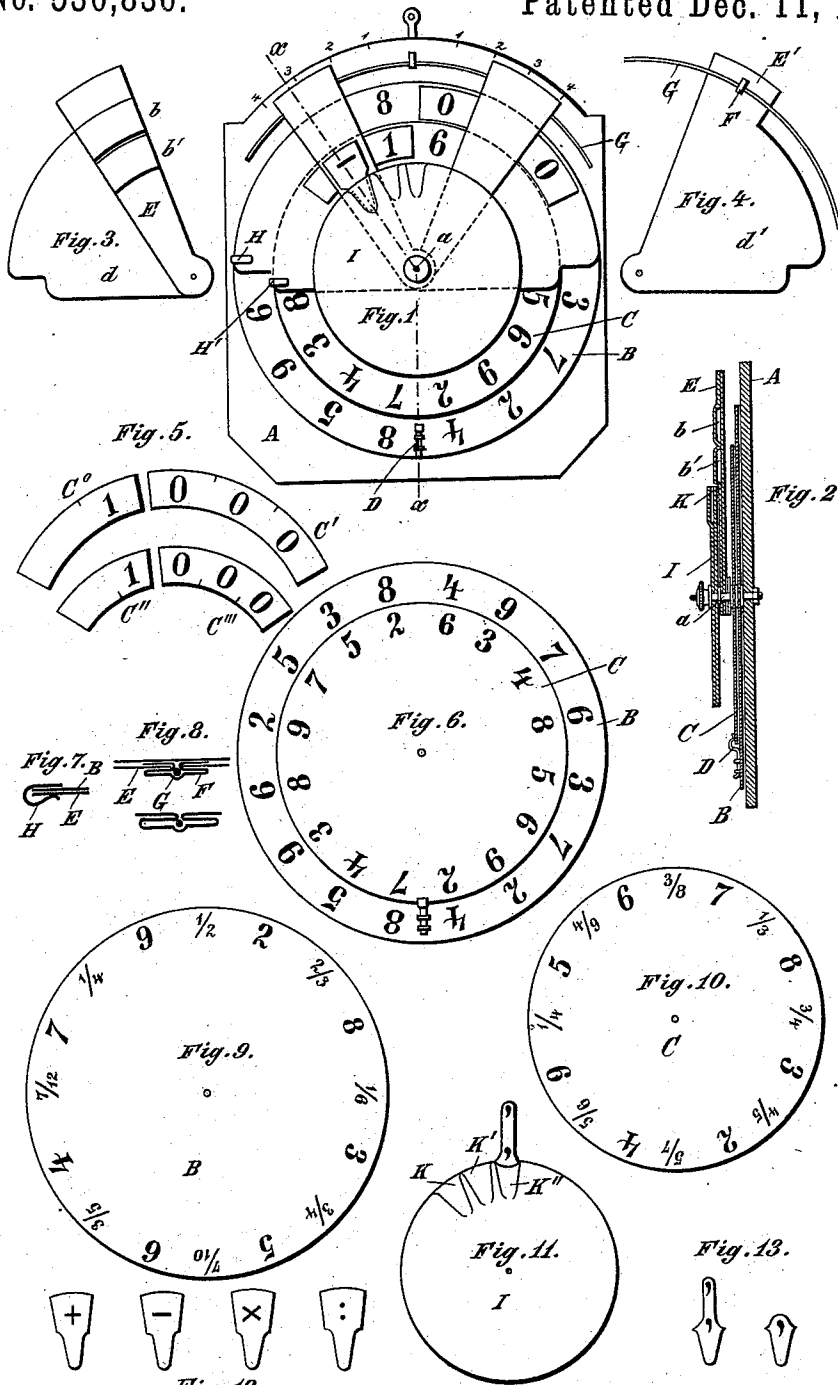


(No Model.)

F. A. GÖTTSCHE.
CALCULATING CLOCK OR DIAL.

No. 530,836.

Patented Dec. 11, 1894.



Witnesses.

J. D. Kingsberg.
G. A. Kumbenschmidt.

Inventor.

Friedrich A. Götsch
By Whitaker & Brewster, Attys.

UNITED STATES PATENT OFFICE.

FRIEDRICH ADOLF GÖTTSCHE, OF KIEL, GERMANY.

CALCULATING CLOCK OR DIAL.

SPECIFICATION forming part of Letters Patent No. 530,836, dated December 11, 1894.

Application filed July 19, 1894. Serial No. 517,996. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH ADOLF GÖTTSCHE, schoolmaster, of 31 Eckernförder Chaussee, Kiel, in the Empire of Germany, have invented a new and useful Calculating Clock or Dial, of which the following is a specification, reference being had therein to the accompanying drawings.

The subject of this invention is a calculating machine, similar to a clock or dial in its outward appearance, and which it is therefore intended to call a "calculating clock." It is adapted for use as a means of teaching arithmetic, in schools; its object being to present to the students a great variety of arithmetical problems or "sums" worked out in a clear and simple manner, the examples chosen belonging to any department of elementary arithmetic that may be required, although the improved reckoning contrivance is by no means intended as a substitute for either the usual manuals or exercise books, or for mental calculation as now practiced.

The object of the "calculating clock" is only to provide the teacher, for certain purposes and in certain cases, with an auxiliary means, both for facilitating his own task of clearly expounding the theory of the different processes of calculation, and for making the lessons as impressive and fruitful as possible to his pupils.

The arithmetical "clock" is represented in the accompanying drawings, Figure 1 being a front elevation of the complete "clock;" Fig. 2, a section thereof on line xx Fig. 1 and Figs. 3 to 13 detail views, partly in elevation and partly in section.

A is the supporting plate consisting of a disk of cardboard, wood, or any other suitable material, on which the "clock" is mounted. It has a pin or spindle a in its center, whereon two other superposed disks B and C, unequal in diameter, are adapted to turn. These disks are provided on their front and rear surfaces with a peripheral row of figures, the figures on one side representing integral numbers and those appearing on the opposite side being fractions, both simple and compound, if required. The larger of the disks B, on either side carries a spring D adapted to move along the edge of the smaller disk C with slight friction and under the guidance of

clamps made of wire. The object of this device is, to enable the two disks to be brought to an almost unlimited variety of positions in relation to each other, so as to form corresponding combinations of figures, and to undo or change such combinations as the problems to be dealt with may require. Over the disks are placed two colored segment-shaped cardboard covering plates $E E'$, the central portions of which are adapted to turn upon the spindle or pivot a , while the lower parts of their peripheries are guided along a guide rod G by means of a "friction clamp" F (see Fig. 8) in such a manner that the segments may, by simple pressure, be brought nearer together, or moved farther away from each other, as the case may be.

The covering plates consist each of two sheets of cardboard, so attached one above the other as to leave a recess or slot b or b' corresponding with each of the rows of figures, into which there may be slid a series of arc-shaped cardboard strips $c^0 c' c''$ and c''' , bearing "ones" or "naughts" and serving to form numbers consisting of a "1" and one or more ciphers behind it. The lower portion of each of these covering plates is somewhat extended in the outward direction as at $d d'$, so that those figures which are situated next to the figures that happen to be dealt with in the problem in hand, are as completely as possible concealed from view. If necessary the device may be supplemented by a pair of indices, concealing the entire lower part of the figure-carrying disks or dials. By means of a clamp H or H', either the larger or the smaller disk, after releasing the spring D is alone turned. The auxiliary disk I similarly to the indices, consists of two cardboard plates or sheets, superposed and fixed together in such a manner that there is left an empty space at $K K' K''$, into which space is inserted a slip having one of the arithmetical signs $+$ $-$ $\times$ or $:$, according to the nature of the problem to be worked out, inscribed upon it. (See Fig. 12.) The auxiliary disk at the same time serves to secure the slip bearing the decimal point or comma, as shown at Fig. 13, for problems dealing with decimal fractions. The disk I is passed on the pivot a over the two indices, and turned in such a manner that the sign, whatever it may be, takes up

the position which, in the course of the calculation, it is supposed to occupy.

To prevent the disks or dials from slipping off the pivot or spindle a , such spindle is provided with a nut.

The following are a few examples which will illustrate the manner in which the improved reckoning "clock" is to be used in practice.

The "clock" or combination of dials is best hung up on the usual blackboard, or on one of the walls of the schoolroom upon which there falls sufficient light. The several dials or disks are then so adjusted as to suit the particular kinds of "sums" to be dealt with, and then adjusted.

Suppose such sums as the following have to be worked out: $7+5$, $9+2$, $4+6$, &c. These being what may be called "elementary sums" with single figures, the indices E E' should be so adjusted that the inner edge is directed toward the mark "1." (See the scale at the upper edge of the dial.) The children are then told to work out one sum after the other, the dials being at each fresh sum turned a space corresponding to one figure, either with the finger or by the aid of a piece of india-rubber or the like.

In the case of problems with numbers composed of two figures, such as: $48+17$, $63+58$, $36+74$, &c., the indices should be placed against the mark "2." In the case of numbers consisting of three figures, they should be brought opposite to the mark "3." In the case of numbers consisting of four figures, they should be brought up to the mark "4."

The circular rows of figures on the two disks include the numbers 2 to 9, which do not follow each other in their normal order. When it is desired by means of these figures to form numbers having a "1" for their first figure in front, or an "0" for their last figure (for example, 16, 124, 1538,—40,600,8000), the cardboard slips c^0 , c' , c'' , c''' (Fig. 5) are inserted into either the upper or the lower slot (b or b') of one of the two indices.

In forming series of problems such as the following: $60-14$, $80-17$, $40-16$, &c., it will be necessary to insert, for example, a "0." at the top on the right, and a "1" below on the left (Fig. 1).

As regards the employment of the auxiliary disk I. this has already been with sufficient clearness set forth above. The master will, of course, please himself as to whether, and to what extent, he will make use of the small cardboard slips, bearing the arithmetical signs $+$, $-$, $\times$, and $:$ as these signs are not absolutely necessary, not being generally used in mental calculation, especially in the ele-

mentary stage, where children are simply told to "add," "take off," &c.; some colloquial phrase replacing the expressions "plus," "minus," &c. Where, however the slips in question are employed, they may, in addition to fulfilling their proper or original object, be made serviceable in a variety of secondary ways. In such problems as: $84+9$, $56+8$, &c., the "plus" slip may be so turned, for example, as to make the "plus" sign serve at the same time for covering over the tens in the lower number, so that for this purpose, a special white slip need not be inserted.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a device for teaching arithmetic the combination with the concentric dials of different diameters provided with numerals, of covering plates adjustable toward and from each other to expose one or more characters of each dial, substantially as described.

2. In a device for teaching arithmetic the combination with the concentric revoluble dials, of the covering plates, adjustable toward and from each other to expose one or more characters of each dial, said plates having recessed portions to receive removable characters, substantially as described.

3. In a device for teaching arithmetic the combination with the concentric revoluble dials, of covering plates adjustable toward and from each other to expose one or more characters of each dial, a device provided with sockets and removable parts bearing the signs indicating arithmetical operations adapted to engage said sockets, substantially as described.

4. In a device for teaching arithmetic the combination with the revoluble concentric dials provided with numerical characters, of the segmental covering plates, adjustable toward and from each other to expose one or more characters on each dial, and spring clips for securing said dials in position, with respect to said covering plates, substantially as described.

5. In a device for teaching arithmetic the combination with the supporting plate, provided with a guide rod, of concentric calculating dials, covering plates provided with devices frictionally engaging said guide rod for adjusting said plates from and toward each other, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

FRIEDRICH ADOLF GÖTTSCHE.

Witnesses:

CARL KRAUSE,
HERMAN HOLSTINS.