No. 651,940. Patented June 19, 1900.

E. G. TASSO.

PERPETUAL CALENDAR.

(Application filed Aug. 17, 1899.)

(No Model.)

Fig. 1. Fig. 2 Fig. 3.

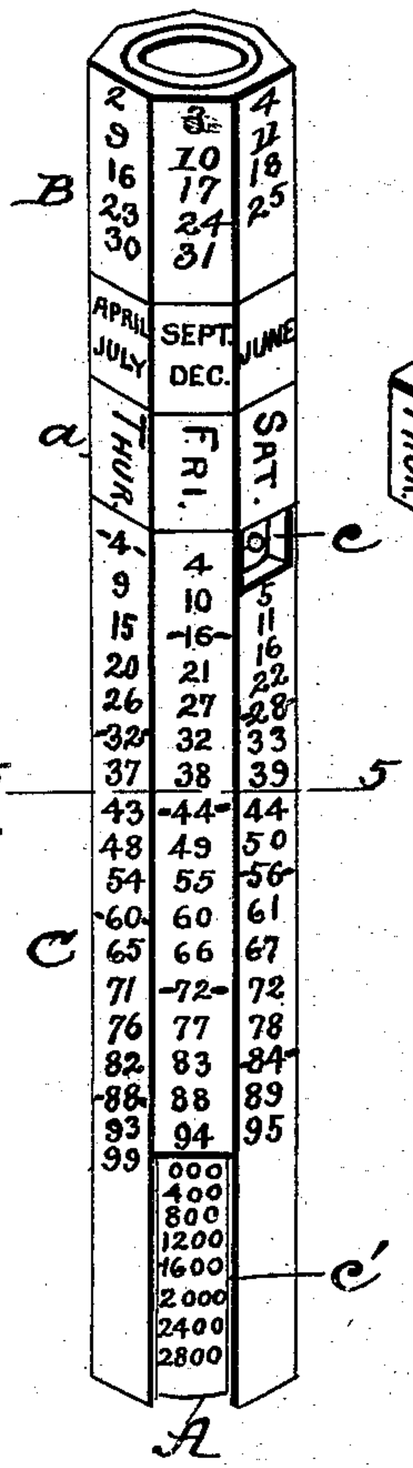


Fig. 4.

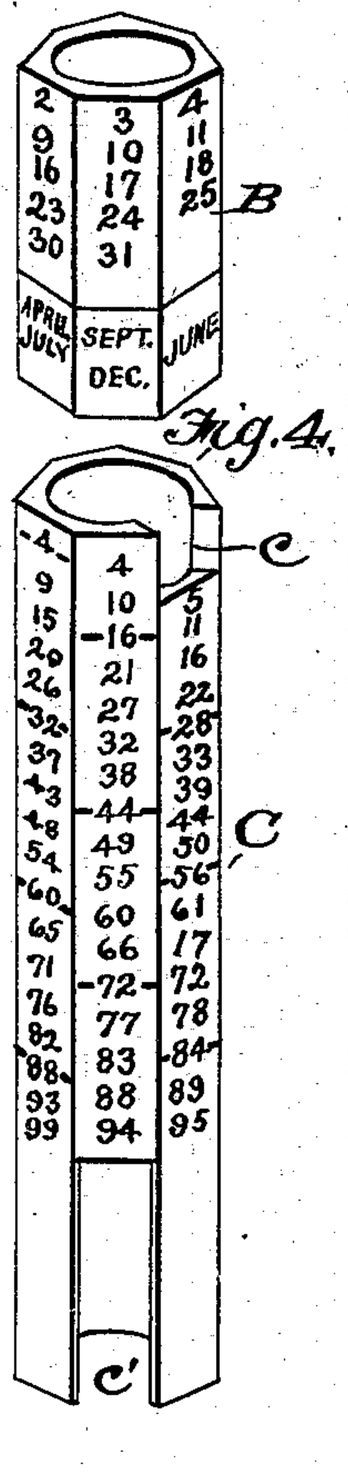


Fig. 6.

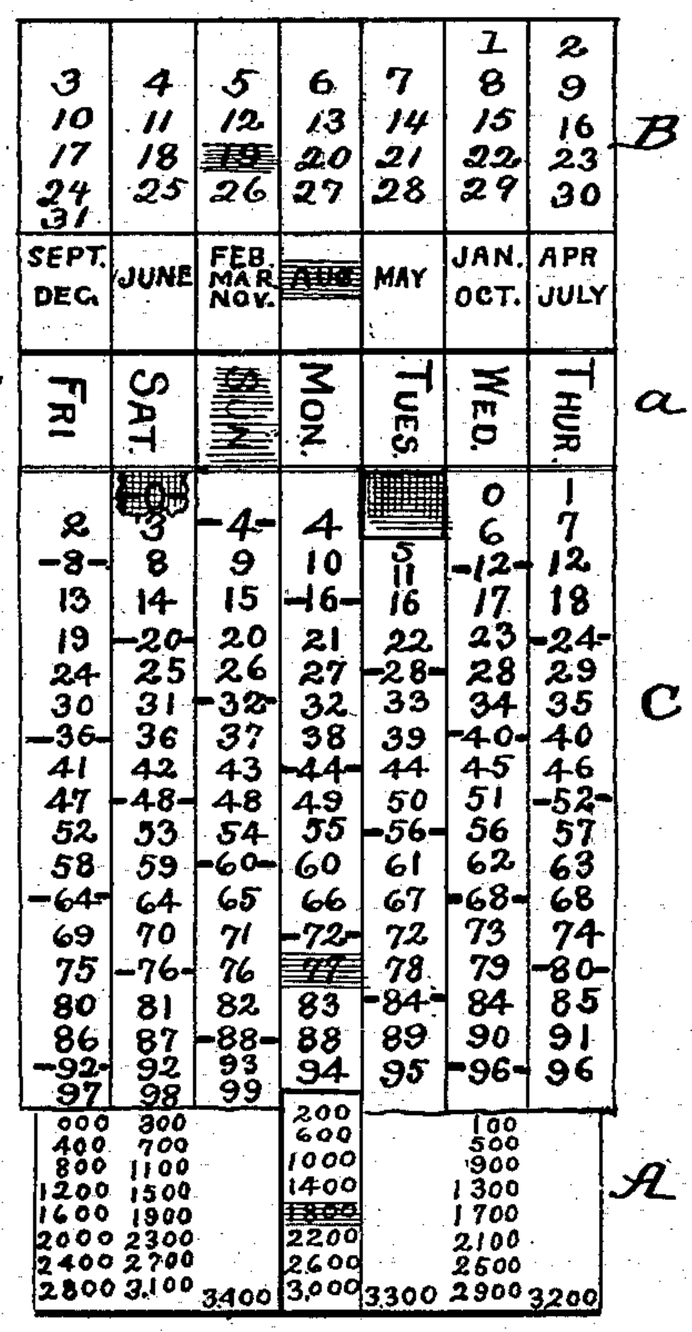
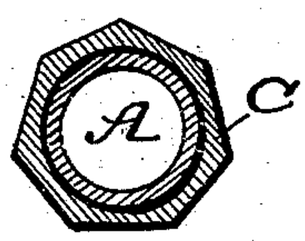


Fig. 5.



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PERPETUAL CALENDAR.

SPECIFICATION forming part of Letters Patent No. 651,940, dated June 19, 1900.

Application filed August 17, 1899. Serial No. 727,610. (No model.)

To all whom it may concern:

Be it known that I, EMIN G. TASSO, a subject of the Turkish Government, residing at Cairo, Egypt, have invented an Improved Perpetual Calendar or Almanac, (registered in the Mixed Tribunal, Cairo, No. 73, bearing date March 27, 1899,) of which the following is a full specification.

My invention is an improvement in that class of perpetual calendars which are constructed in the form of a cylinder or a polygonal tube. The construction of the same and its novel features are hereinafter described.

In the accompanying drawings, Figure 1 is a perspective view of my calendar complete. Fig. 2 is a perspective view of the cylindrical body of the same. Fig. 3 is a perspective view of the rotatable part or cylinder inscribed with the names of the months and the numbers indicating the days of a month arranged in columns. Fig. 4 is a perspective view of the other rotatable part or cylinder inscribed with the numbers of the years arranged in columns. Fig. 5 is a cross-section on line 5 5 of Fig. 1. Fig. 6 is a diagrammatic plan view showing the entire exterior portion of the calendar laid out in the flat.

The calendar is composed of the following parts: a cylindrical body A, having an enlarged circumferential portion *a*, and two hollow polygonal tubes B and C. These tubes may, however, be made cylindrical exteriorly, the polygonal form being used merely as preferable for inscribing and reading of numbers thereon. The parts B and C rotate on A, but fit closely enough to have such friction as enables them to retain any position to which they may be rotatably adjusted. The fixed enlargement *a* on inner cylinder A bears seven columns designated by the abbreviations for the seven days of the week—"Sun.," "Mon.," "Tues.," "Wed.," "Thurd.," "Frid.," and "Sat." The reduced lower portion of this inner cylinder also bears seven columns registering with the seven columns on the week-day enlargement *a*. Such lower columns have arranged therein the closing years of the century, called for convenience "century-years"—such as 1600, 1700, 1800, 1900, 2000, &c.—and these are arranged according to the following principle: It is found by calculation that every such century-year begins two days earlier in the week than did the preceding century-year, unless such preceding century-year be a leap-year, in which case the century-year following such leap-year begins but one day earlier in the week. Thus the leap-year 1600 began on Saturday. 1700, the next century-year following the leap-year 1600, began one day earlier in the week than did 1600, or on Friday, while 1800, not following a leap-year century, began two days earlier in the week, or on Wednesday. 1900 in like manner began two days earlier, or on Monday, and 2000 will begin on Saturday; but 2100, following a leap-year century, will begin one day earlier in the week, or on Friday.

From the above it is seen that the initial day of both leap-years 1600 and 2000 is Saturday and that 1700 and 2100 began on Friday, from which it may be readily deduced that, according to the Gregorian calendar, every fourth century begins on the same day of the week, and the order holds for other years than century-years. Thus since 1899 began on Sunday it may be known without calculation that 1499 began on Sunday and 2299 will also begin on Sunday. It is possible, therefore, to arrange a table of century-years according to this principle, and such a table is seen on the lower end of the inner cylinder A, as above indicated.

Inasmuch as the present method of counting leap-years is not strictly accurate, it has been proposed to consider the year 3200 and multiples thereof not leap-years, but common years, in order to correct this inaccuracy. This necessitates a new system of columns in the table, containing the years 3200, 3300, &c., but constructed on the same principle as above. While the succeeding centuries, as above stated, begin two days earlier in the week than their predecessors, the years themselves begin one day later—that is to say, every succeeding year begins one day later in the week than did its predecessor, unless such predecessor be a leap-year, in which case it begins two days later. Thus the year 1859 began on Saturday, 1860 on Sunday, and 1861 on Tuesday. Hence it will be seen that a table may be readily prepared embodying this principle. Such a table is found on the lower outer tube or cylinder C, which is to be used, in connection with the century-years on the

inner cylinder A, above described, to designate any required year, the first two figures of the year being read from the century-table on A through the slot *c'* and the last two from the cylinder C. When thus adjusted, as shown in Fig. 1, the last two figures of the year will register with the week-day upon which that year began. Thus the years 1802, 1808, 1813, and 1819, as shown in Fig. 6, began on Friday. Of these, however, the year 1808 was a leap-year, and while it began on Friday, as stated, and continued through January and February just as if it had been a common year, it did not so continue after February 29; but, owing to the interposition of the extra day, (February 29,) the first day of March, as well as every day thereafter, was crowded back one day farther from January 1 than it would otherwise have been, and the year was finished up as if it had begun on Saturday instead of on Friday. For this reason the numeral "8" on cylinder C is repeated in the adjacent column, and the first one is designated by placing it between dashes, as shown. The same repetition is made for all the leap-years, as shown on cylinder C. The first of these repeated numerals is used in adjusting the calendar, as hereinafter described, for the first two months of any leap-year, or before February 29, while the second numeral in the adjacent column is to be used after February 29.

The upper or smaller rotatable tube or cylinder B carries the month-numerals "1" to "31," arranged in seven columns corresponding to the seven days of the week, said arrangement being so well known as to require no description. In the same column with the numeral "1" of this series and below it, as shown in Fig. 6, the abbreviation "Jan." is placed. It will then follow as a necessary consequence that when the collar or cylinder B is so adjusted with respect to the tube C that "Jan." stands over the required year the four items involved in the date (week-day, month, month-numeral, and year) will be in register. Thus in Fig. 6, which shows the parts A and C adjusted for the nineteenth century, there may be read from the sixth column "Wednesday, Jan. 1, 1800" or "Wednesday, Jan. 1, 1806." From this same figure it is seen that January 31 of these years falls on Friday, and it follows that February 1 falls on Saturday. Hence to set the calendar for February the collar B must be turned forward three spaces until the numeral "1" thereon registers with "Saturday" on the fixed cylinder A; but the new month "Feb." must also register with the required year on tube C, as "Jan." did before. To this end the name "Feb." must be placed on collar B three spaces to the left of "Jan." Since February in common years contains exactly four weeks, the month of March begins on the same day of the week as does February. Hence the calendar needs no readjustment in passing from February to March in such years; but since March contains thirty-one days, or three days more than four full weeks, in setting the calendar for April it will be necessary to turn the collar B forward three spaces, as explained above, and to place "Apr." on collar B three spaces to the left of "Feb." and "Mar." Since April has but thirty days, "May" will be placed but two spaces to the left of "Apr.," and the entire set of month-names will when completed be arranged as shown clearly in Fig. 6.

To use the calendar, the tube C is turned upon the cylinder A until the required century shows through the opening *c'*. Then the collar or upper tube B is turned until the required month registers with the last figures of the year on tube C. In case of leap-years the given month, if January or February, must register with the numerals on tube C located between the dashes; but if any other month than January or February it must be set to register with the duplicates of these numerals in the column to the right thereof. Thus Fig. 6 shows the calendar set for February, 1809, and also for March, 1809. It is likewise set for February, 1804; but it is not set for March, 1804. To set it for the latter month, the collar C must be turned one space to the right or until "Mar." registers with "4" in the fourth column.

It is thus seen that every year ending in "4" "8" "12" "16," &c., is a leap-year, no matter in what century it occurs, and such numerals are always repeated in adjacent columns, as seen in Fig. 6, and in using the calendar it soon becomes a matter requiring no reasoning to use the duplicated year-numerals in the manner above described. A difficulty arises, however, in the case of years ending in "00," which are sometimes leap-years and sometimes common years. In order to obviate this difficulty, I have placed on the inner cylinder A and between dashes a zero (0) so positioned with relation to the column of century leap-years below that when the tube C is so turned as to expose this column through the lower opening *c* this extra "0" will show through the upper opening or notch *c'* at the top of tube C in front of the zero-column 6 thereon, and thus there will be supplied the duplicated year-number, which is to be used precisely as the duplicated leap-year numbers when both are found on tube C, as above described. When this tube is not turned so as to expose leap-years through opening *c'*, the extra "0" on cylinder A is hidden behind tube C. Thus, as shown in Fig. 1, the leap-year column on cylinder A is exposed on this cylinder, while in Fig. 6 the leap-year column is represented as not exposed and the "0" on cylinder A is likewise hidden. It is thus seen that the user may know without calculation whether any year ending in "00" is a leap-year and whether or not he is to shift the collar B between "Feb." and "Mar."

The following is a practical illustration of the manner of using the calendar: Suppose the date of a person's birth to be August 19,

1877. We turn the longer cylinder C on the body A until the centurial number "1800" appears in the slot *c'*. (See Fig. 4.) Then the number "77" is sought, and in this instance it happens to be in the column above "1800" on cylinder C. The shorter cylinder B is then adjusted to bring the abbreviation "Aug." directly over or in vertical alinement with the column on C in which "77" appears. Then we follow around B to the left until we find the number "19," which is directly over and in alinement with the abbreviation "Sun." on the portion *a* of body part A. Hence the 19th day of August, 1877, fell on a Sunday. The several marks "19," "Sun.," "77," and "1800" are indicated by horizontal shade-lines.

The following is another example: Suppose the date given be January 27, 1841. The cylinder C is adjusted, as before, so that "1800" may be read in its slot *c'*. Then adjust cylinder B so that the sign "Jan." will be in line with the column on C in which "41" appears. Then follow around on B to the left, and "27" will be found over "Wed.," which is the day sought.

The calendar, as shown, is constructed on the supposition that the Gregorian system has been in operation since the beginning of the Christian era, which of course is not true; but old-style dates may be readily found from the Gregorian dates furnished by the calendar.

What I claim is—

1. As an improved article of manufacture, the tubular calendar hereinbefore described, the same comprising the inner cylinder, A, having a raised circumferential portion bearing the names of days of the week, and on its lower portion century leap and common years in columns, a tube C, which is applied to and rotates on the cylinder below such circumferential portion, and inscribed with numerals of years arranged in columns, and the shorter tube B, which is applied to and rotates upon the upper part of such cylinder, and bears the names of months and numerals of days of the months, in columns, the said raised portion of the cylinder forming a stop which the inner ends of the rotatable tubes abut, as shown and described.

2. As an improved article of manufacture, the tubular calendar hereinbefore described, the same comprising the inner cylinder A having a raised circumferential portion bearing the names of days of the week, and on its lower portion century leap and common years in columns, a tube C, which is applied to and rotates on the cylinder below such circumferential portion, and inscribed with numerals of years arranged in columns, and the shorter tube B, which is applied to and rotates upon the upper part of such cylinder, and bears the names of months and numerals of days of the months in columns, said cylinder bearing a sign or symbol which, in the rotation of the longer tube C, indicates the use of the century leap-year column, substantially as shown and described.

3. The combination with the inner tube A, carrying the names of days of the week arranged serially, and adjacently a symbol "0," and its lower portion having the century-years arranged in seven columns, common and leap years being separated, the outer and lower rotatable tube C, having notches at top and bottom which are spaced apart laterally by the width of a column, and inscribed with seven columns of numerals indicating years, and the upper rotatable tube B, having names of the months and columns of numerals indicating days of the months, the arrangement being such that when the aforesaid symbol "0" is visible through the upper notch of tube C, the century leap-years appear through the lower notch of the same, as shown and described.

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