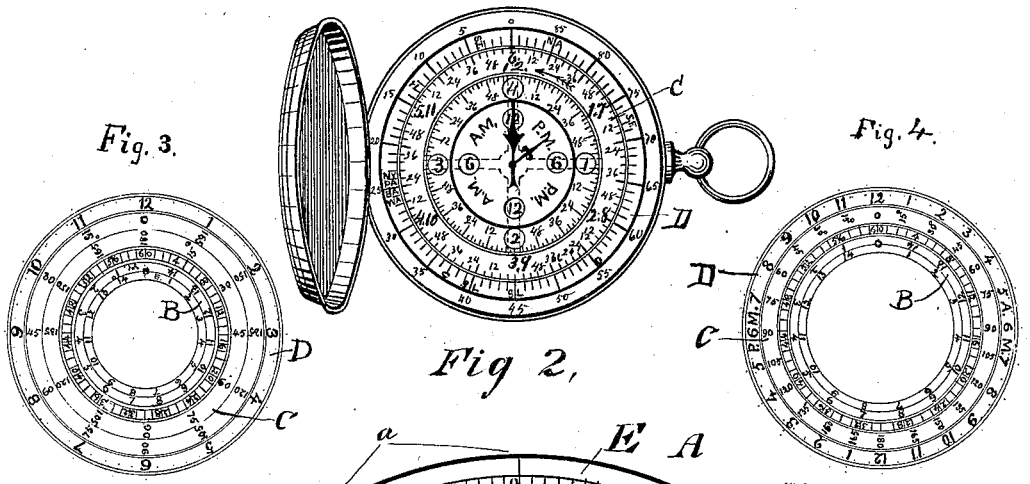
(No Model.)

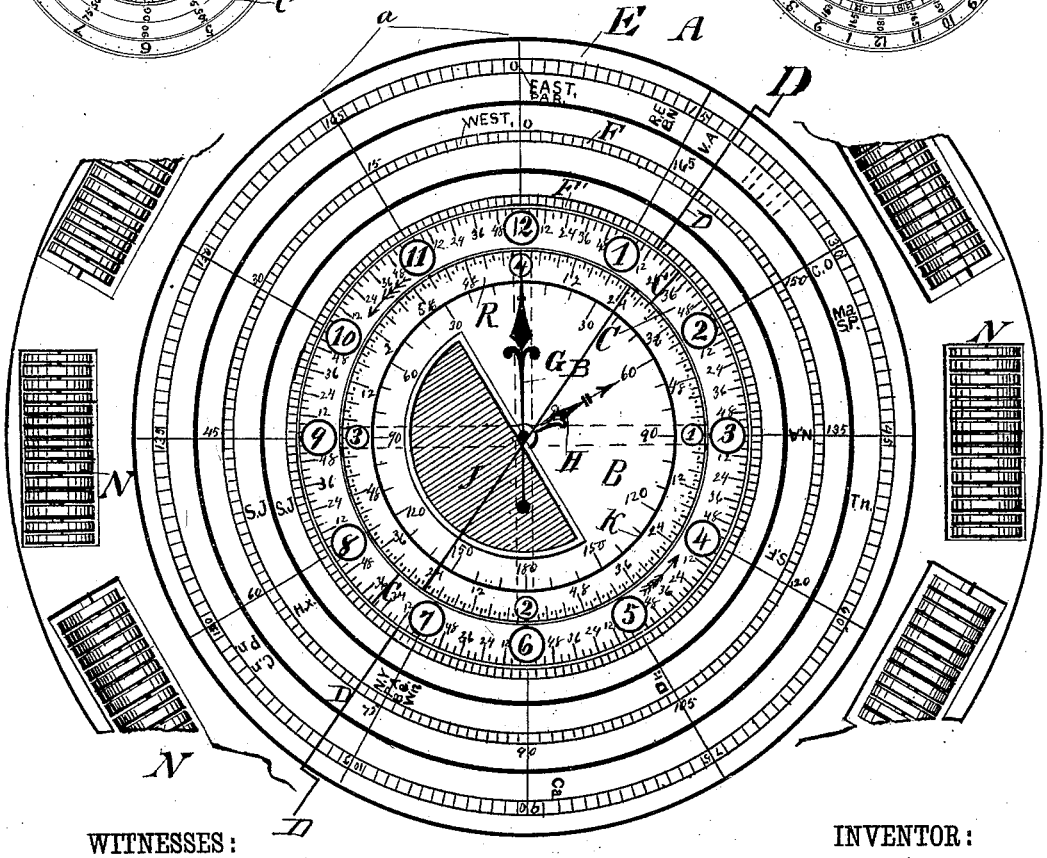
A. M. CORY.

UNIVERSAL CLOCK.

No. 301,215. Patented July 1, 1884.

Fig 1.





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ABRAHAM MORRELL CORY, OF NEW PROVIDENCE, NEW JERSEY.

UNIVERSAL CLOCK.

SPECIFICATION forming part of Letters Patent No. 301,215, dated July 1, 1884.

Application filed August 26, 1882. (No model.)

To all whom it may concern:

Be it known that I, ABRAHAM M. CORY, of New Providence, in the county of Union and State of New Jersey, have invented a new and Improved Universal Clock, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved clock which indicates the time for every degree of longitude or subdivision of such degree with only a single clock-movement.

The invention consists in a universal clock formed of a rotating dial-annulus divided into subdivisions of time, and surrounded by a fixed ring divided into degrees, whereby the time on each and every meridian will be shown at the same time, and if the correct time on one meridian is given the time at any other meridian can be obtained without calculations by simply observing the hour and minute opposite the desired degree.

The invention further consists in the combination, with the above clock, of a minute-hand for indicating minutes and fractions thereof.

The invention also consists in additional disks mounted on shafts in such a manner as to correspond with certain degrees, on which disks the names of places are printed which are on the same degree with which these said disks correspond in position.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of a watch provided with my universal time-dial, which is arranged for ninety degrees. Fig. 2 is a plan view of a clock-dial with my improvement arranged for one hundred and eighty degrees; and Figs. 3 and 4 are modifications in which the dial is stationary, and the longitudinal ring and the disk B, with subdivisions on it, are movable.

The dial A of the clock consists of a central fixed disk, B, and a rotating annulus, C, surrounding the disk B, which annulus C is surrounded by a fixed ring, D. The ring D is provided with two concentric circles or double-circular lines, E and F, which are divided into sections of fifteen degrees, each section being subdivided into groups of degrees, into single degrees, or into fractions of degrees, as may be desired. In the case shown the rings are divided into divisions *a* of fifteen degrees each, and these sections are divided into single degrees. The subdivisions of the outer circle E are marked with numerals from left to right, and the subdivisions of the circle F are marked with numerals from right to left, the zeros of the two rings corresponding. The rotary annulus C is divided into twelve equal parts, each part representing one hour, and each one may be divided into sixty minutes, and, if desired, into fractions of minutes. The fixed central disk, B, has its periphery divided into four equal parts, each representing one minute, and each one divided into sixty seconds or into fractions of seconds. The annulus C is connected with the clock-work below the dial in such a manner that this ring rotates once in twelve hours, and a second hand, G, is connected with the central arbor of the clock-work in such a manner that it rotates once in four minutes. The initials of cities east of Greenwich are written, printed, or otherwise produced on the ring D adjoining to the graduated circle E, and the names of cities west from Greenwich are arranged adjoining the graduated circle F of the ring D. In the case shown the initials of the names of cities east of Greenwich are arranged around the inner edge of the circle E, and the names of the cities west of Greenwich are arranged around the circle F; and, if desired, the names of the cities west of Greenwich can be written, printed, or otherwise produced adjoining to the inner circle, F', hereinafter more fully described.

A hand, H, may be mounted on an arbor of the works above the central disk, B, in such a manner that it will revolve once in twenty-four hours. To this hand a semicircle, J, of card-board or other suitable material, is attached, and the disk B is provided with a circle, K, consisting of two semicircles, each divided into one hundred and eighty degrees.

As shown, the clock indicates twelve o'clock at London or Greenwich. If the time in New York is desired, the initials of New York are found on the ring D, and that time-mark on the ring C which registers with the mark denoting the longitude of New York denotes the

time at New York, and it will be seen that it is seven o'clock or a few minutes past seven at New York. In St. Johns the time will be found to be 8.36, in Halifax 7.48, and so on. As these cities are west from Greenwich, their time will be so much slower than that of London. If the time of Berlin (expressed in the drawings by B'n on the ring E to the right of the zero) is desired, it will be found to be about 12.48. At Teheran, in Persia, (expressed in the drawings by T'n on the ring E,) when it is twelve o'clock in London, it will be 3.24, and so on. The time of any city on the globe may be found, provided the longitude of the city is known. It may frequently happen that so many cities are on the same meridian that all of their names cannot be printed on the ring D. For that reason I have provided a series of disks, N, mounted on suitable shafts in such a manner that each disk will correspond with a degree on the divisions of the circles E and F. The names of a number of cities can be printed, stamped, or otherwise produced on the edges of these disks N, all the names printed on the same disk having the same longitude. The disk can easily be turned until the desired name appears uppermost.

It may happen that the time and longitude marks on the annulus C and ring D may not register when the time or longitude is required in a given place. In such event the angle of their separation is indicated by the fractional numbers on the disk B, a complete rotation being effected during the interval elapsing between the registering of the marks on the rings C and D, the fractional time or longitude for any given place when the marks do not register being indicated by the numbers on the disk B, pointed out by the hand G, or by the rotation of the disk B.

If desired, the subdivisions of the annulus C may be made equal to ten minutes, and one rotation of the hand G or a rotation of the disk B equal to ten minutes; but such modifications do not affect the invention, as in all cases the time required by the hand G to make one revolution should be equal to the unit on the annulus C. An inner circle, F', of divisions of longitude is provided on the inner circumference of the ring D, corresponding with the circles of longitude E and F, the purpose of which is to facilitate the finding of the time-mark on the annulus C corresponding with the longitude-mark of the place for which the time is sought. The hand H always points to the meridian upon which the sun is, or to the degree of longitude where it is midday, and the semi-disk J is turned toward the dark or shaded half of the earth.

In place of dividing the rotating annulus C into twelve hours and having it rotate once in twelve hours, it may be divided into twenty-four hours and rotate once in twenty-four hours. In that case only one ring, E or F, will be required, and that must be divided into three hundred and sixty degrees.

In Fig. 1 the ring D is divided into ninety spaces of four degrees each, representing degrees of longitude, and as here shown indicates by its divisions the time for all points on any given quadrant of the globe. Another ring, representing another quadrant, may be substituted for the ring D, said ring having other numbers and other localities, or designating characters upon it for any other quadrant of the earth. For instance, in Fig. 1 the time is shown at points between St. Johns and New Archangel. A ring substituted for this might show the time for all places in a quadrant of ninety degrees, beginning at any meridian of longitude and at a different latitude.

In Fig. 1 I have divided the annular dial C into six hour spaces only. I must have two numerals at each division to make up the number 12. Thus opposite the several divisions successively are marked 1 7, 2 8, 3 9, 4 10, 5 11, 6 12. If the dial-ring C should be divided into four spaces only, there would have to be three numerals at each division, &c.; otherwise the clock or watch shown in Fig. 1 operates in the same manner as the clock shown in Fig. 2.

I have described these numerous modifications and changes of my invention to show that the principle of the same is not changed. In all cases I have a ring divided into degrees. Further, I have a rotating annulus divided into hours, and I have a minute-hand for indicating minutes and fractions of minutes. The modifications only affect the construction, and the details of these changes depend, chiefly, upon the size of the clock. For instance, in a large permanent clock in an observatory, I would divide the outer circles, E and F, into three hundred and sixty degrees, and would divide the dial-annulus C into twenty-four hours, and I would also provide the disks N. For a watch I would not make the dial any larger than that shown in Fig. 1, and would leave off all parts that could be omitted without affecting the working of the same.

The above-described mechanisms may be combined with a clock which indicates the standard time at the place at which the clock is located.

Without departing from the idea of my invention the time subdivisions may be arranged on the outer or stationary ring, and the meridian subdivisions on the revolving disks.

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

1. The combination, with a revolving dial provided with divisions of time, of a longitude-ring concentric with said dial, and divided into degrees or fractions of degrees, substantially as described, whereby if the time and longitude on one meridian are known the times and longitudes at all other meridians will also be indicated, as set forth.

2. In a universal clock, the combination, with a revolving annular dial, of a fixed ring

concentric with it and divided into degrees, and of a revolving minute-hand, substantially as herein shown and described, and for the purpose set forth.

3. In a universal clock, the combination, with the rotating annular dial C, of the ring D, concentric with it and divided into degrees, of the hand G, and of the central disk, B, within the ring C, substantially as herein shown and described, and for the purpose set forth.

4. In a universal clock, the combination, with the annular dial C, divided into hours and minutes, of the ring D, surrounding it and divided into degrees, the hand G, and the hand H, provided with a semi-disk, J, substantially as herein shown and described, and for the purpose set forth.

5. In a universal clock, the combination, with the revolving annular dial C, divided into hours and minutes, of the fixed ring D, divided into degrees, and a series of disks, N, mounted outside of the ring D, which correspond with the subdivisions of the same for the names of towns or places printed or otherwise produced on the edges, which towns or places are located on the meridian with which the disk corresponds, substantially as herein shown and described, and for the purpose set forth.

6. The combination, with a revolving dial provided with divisions of time, and a longitude-ring concentric with said dial, and divided into degrees or fractions of degrees, of two or more hour-indicating numerals arranged on each hour-division on the dial, substantially as described, and for the purpose set forth.

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