(No Model.) 2 Sheets—Sheet 1.

A. L. SILVERNAIL.

GEOGRAPHICAL CLOCK.

No. 470,309. Patented Mar. 8, 1892.

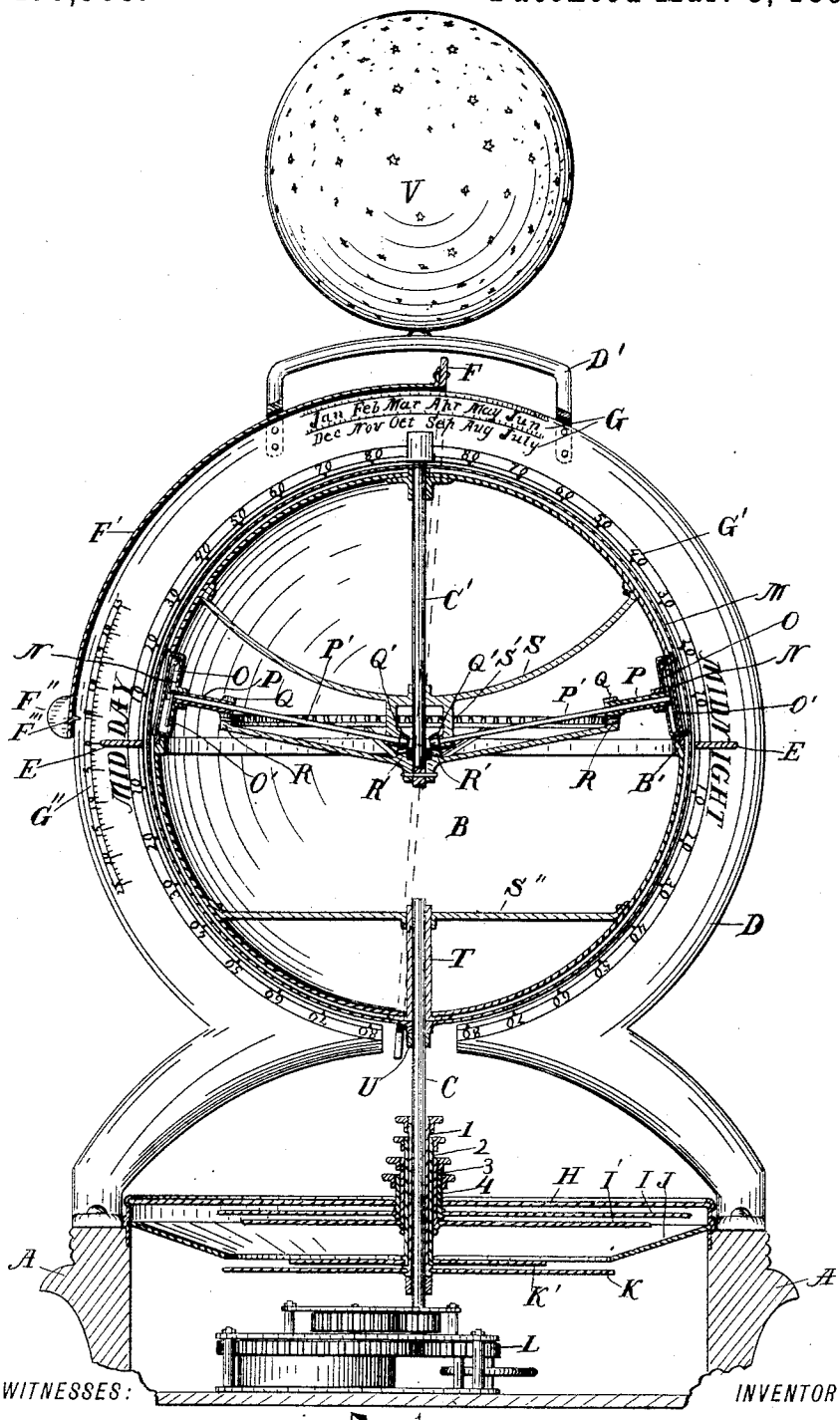

FIG. 1.

Alpheus L. Silvernail
BY
Luther V. Moulton,
ATTORNEY.

Loyd Moulton
Charles W. Tufts

(No Model.)

2 Sheets—Sheet 2.

A. L. SILVERNAIL.

GEOGRAPHICAL CLOCK.

No. 470,309. Patented Mar. 8, 1892.

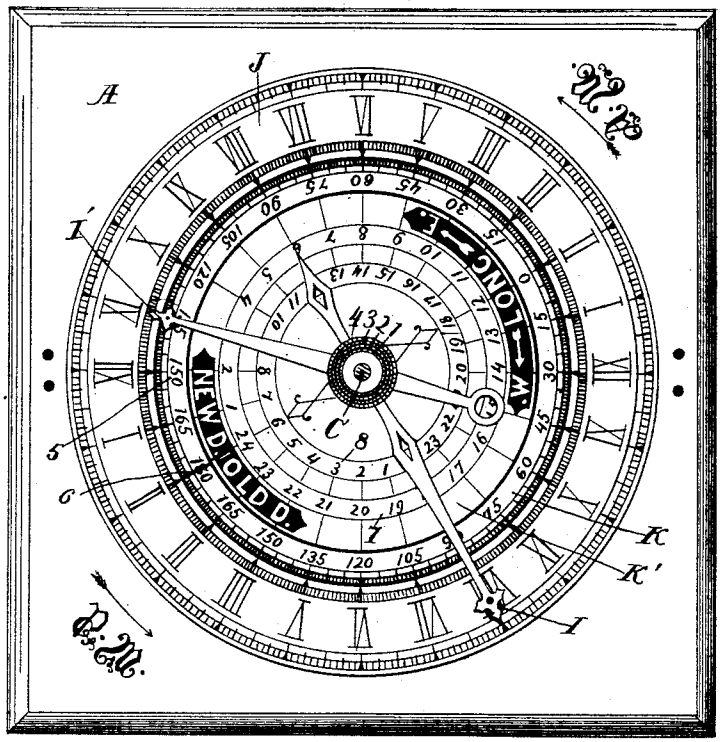

Fig. 2.

WITNESSES:

Louis Mzultfw.
Charles F. Tufts

INVENTOR

Alpheus L. Silvernail

BY

Luther V. Moulton

ATTORNEY.

UNITED STATES PATENT OFFICE.

ALPHEUS L. SILVERNAIL, OF IONIA, MICHIGAN.

GEOGRAPHICAL CLOCK.

SPECIFICATION forming part of Letters Patent No. 470,309, dated March 8, 1892.

Application filed June 8, 1891. Serial No. 395,578. (No model.)

To all whom it may concern:

Be it known that I, ALPHEUS L. SILVERNAIL, a citizen of the United States, residing at Ionia, in the county of Ionia and State of Michigan, have invented certain new and useful Improvements in Geographical Clocks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in the class of geographical clocks shown in patents issued to me as follows: one April 15, 1890, No. 425,833, and one May 12, 1891, No. 452,291; and its object is to provide such devices as are therein shown with certain new and useful features hereinafter more fully described, and particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a central vertical section of a device embodying my invention, and Fig. 2 a plan view of the clock-dials with the globes removed.

Like letters and numerals refer to like parts in both figures.

A represents any suitable stand or case containing the driving-clock L, having a main shaft C adapted to revolve once in twenty-four hours. Upon said shaft is mounted a terrestrial globe B, which is made in two separable hemispheres, being divided at the equator and connected by the flange B′, the lower half provided with a suitable sleeve T, having a suitable brace S″, which surrounds the upper end of the shaft C, upon which is a suitable collar U to sustain the globe in place. The friction between the sleeve T and shaft C is sufficient to cause the globe B to turn with said shaft, while permitting of the adjustment of said globe thereon when desirable. Surrounding the globe in a vertical plane is a frame D, from which depends a fixed shaft C′, which extends to a point near the center of the globe, to the lower end of which is rigidly attached a double gear-wheel having an outer cogged rim or flange R engaging the bevel-pinions Q on the inner ends of the sleeves P, upon the outer ends of which sleeves are the minute-hands O of the dials N and an inner cogged flange R′ engaging the bevel-pinions Q′ on the shafts P′, upon the outer ends of which are the hour-hands Q′ of said dials. The inner end of the shafts P′ are journaled in the hangers S′, depending from a suitable frame-work S, attached to the inner surface of the globe, and the outer ends of the same are journaled in the described sleeves, which in turn are journaled in the dials of the clock N. These shafts and sleeves rotate with the globe around the fixed wheel on the shaft C, and are thus axially rotated in their bearings by said wheel through the described bevel-pinions. Said dials are provided with the usual dials of twelve hours, and the described gearing is so proportioned that as the globe revolves about the fixed wheels R′ R′ the hour-hands of the clocks will revolve twice and the minute-hands twenty-four times to each revolution of the globe. Said dials may be inserted at as many different meridians as desirable and will all move synchronously, and each can be set at the relative time of the meridian on which it is located. I also by this means take motion from a single main driving-cock L for all the dials in the globe.

To the polar circle F, I attach a curved bar F′, to the end of which and vertical to the plane of said circle I attach a semi-cylindrical body F″ to represent the sun, having an index F‴, indicating on the scale G″ the angle of the sun to the equator E for any date in the year to which the circle F may be set on the scale G. I also provide a meridian-finder M, consisting of a slender metallic polar ring journaled on C and C′ and adapted to revolve about the axis of the globe B between said globe and the frame D, whereby any meridian-line may be found on the globe by turning one side of said ring to the same, the other side of the said ring also indicating the opposite meridian, or one hundred and eighty degrees distant. I also provide a celestial globe V, attached to a suitable frame D′, mounted upon the upper part of the main frame D. By observing the relative position of places on the globe B to the constellations on the globe V the appearance of the heavens at such places can be determined for any time of day.

J is the fixed dial of the clock, divided into two equal parts of twelve hours each and having its inner edge divided into degrees.

Said clock is provided with hands I I′, I to indicate time, and I′ to indicate degrees of longitude on said fixed dial, and dials K and K′. Only the outermost rim of the dial K is in sight, and on this are marked the degrees of longitude east and west from a given point up to one hundred and eighty degrees, as at 6, and on the inner dial K′ are marked the hours from "1" to "24," as indicated at 7 and 8. These dials and markings are the same as shown in a former patent to me, dated April 15, 1890, and numbered 425,833, and are used for the same purposes, and therefore need no further description, the difference being in dividing the inner dial into two separate dials K and K′ and in the manner of attaching them to the shaft C, whereby they may be more readily and conveniently adjusted upon the same. The hands I I′ and dials K K′ all revolve with the shaft C and are attached to independent concentric sleeves 1 2 3 4, surrounding said shaft, and each of said sleeves is provided with milled heads, by which said hands and dials can be separately adjusted or "set" upon said shaft.

From the foregoing the operation of my device will be readily understood.

What I claim is—

1. The combination of a clock having a shaft adapted to revolve once each twenty-four hours, a fixed dial divided into twenty-four hours, hands and disks adjustably attached to said shaft by concentric sleeves and rotating with the same, a globe mounted upon said shaft having a series of clock-dials of twelve hours each in its surface at various meridians, and hands adapted to indicate the time thereon, said hands having shafts, sleeves, and gearing connecting them to a fixed gear within said globe, whereby they are synchronously moved over said dials as the globe revolves, substantially as described.

2. In combination with a globe adapted to revolve on a vertical axis and having an adjustable polar circle adapted to indicate the light and dark hemispheres of said globe, a curved bar attached to said polar circle, having attached an index in a position perpendicular to the plane of said polar circle, and a scale on the frame adjacent to said index, substantially as described.

3. In combination with a globe adapted to rotate on a vertical axis and having an adjustable polar circle adapted to indicate the light and dark hemispheres of said globe, a curved bar attached to said circle, having attached an object, as F″, perpendicular to the plane of said circle, and an index, as F‴, also attached to said curved bar and adapted to indicate on a scale, as G″, the inclination of the sun to the plane of the equator, substantially as described.

4. In combination with a terrestrial globe adapted to revolve upon its axis once each twenty-four hours and having a series of clocks adapted to indicate meridian time inserted in its surface, and a celestial globe mounted above said terrestrial globe, whereby the position of the various constellations relative to a given point on the earth at a given time in the day may be determined, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ALPHEUS L. SILVERNAIL.

Witnesses:

LUTHER V. MOULTON,

PLYN WILLIAMS.