No. 637,226. Patented Nov. 21, 1899.

C. J. BOEHM.

TELLURIAN.

(Application filed Jan. 9, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

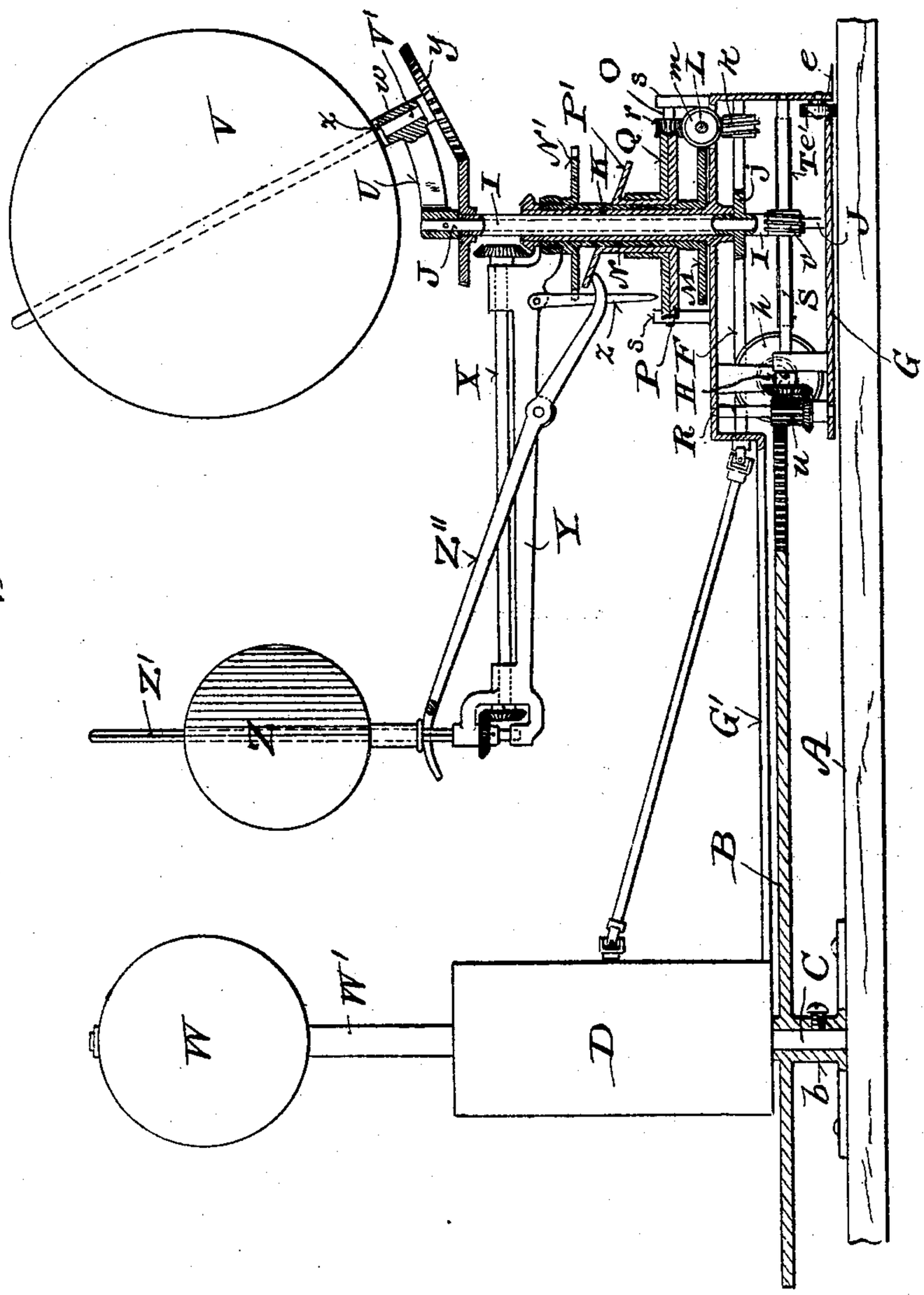

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Fig. 3.

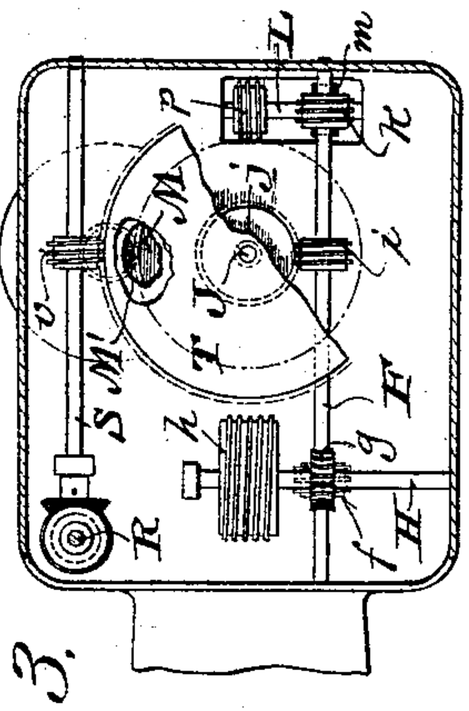


Fig. 4.

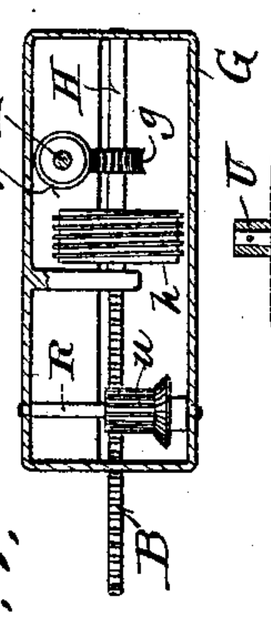


Fig. 5.

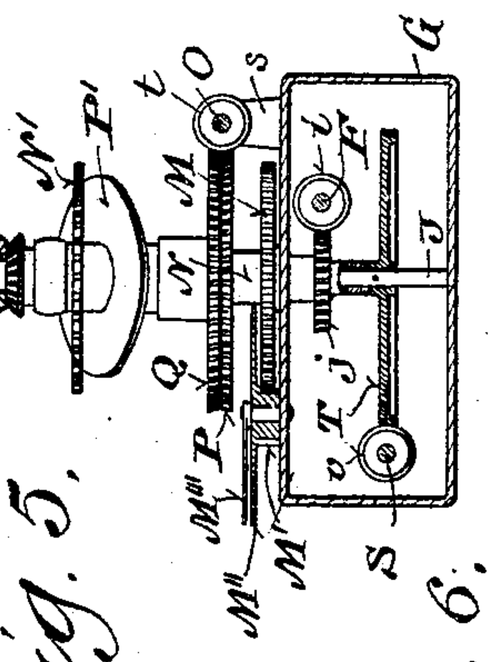


Fig. 6.

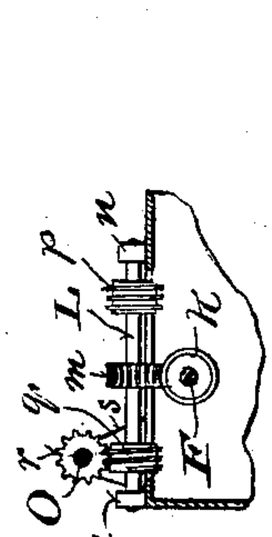
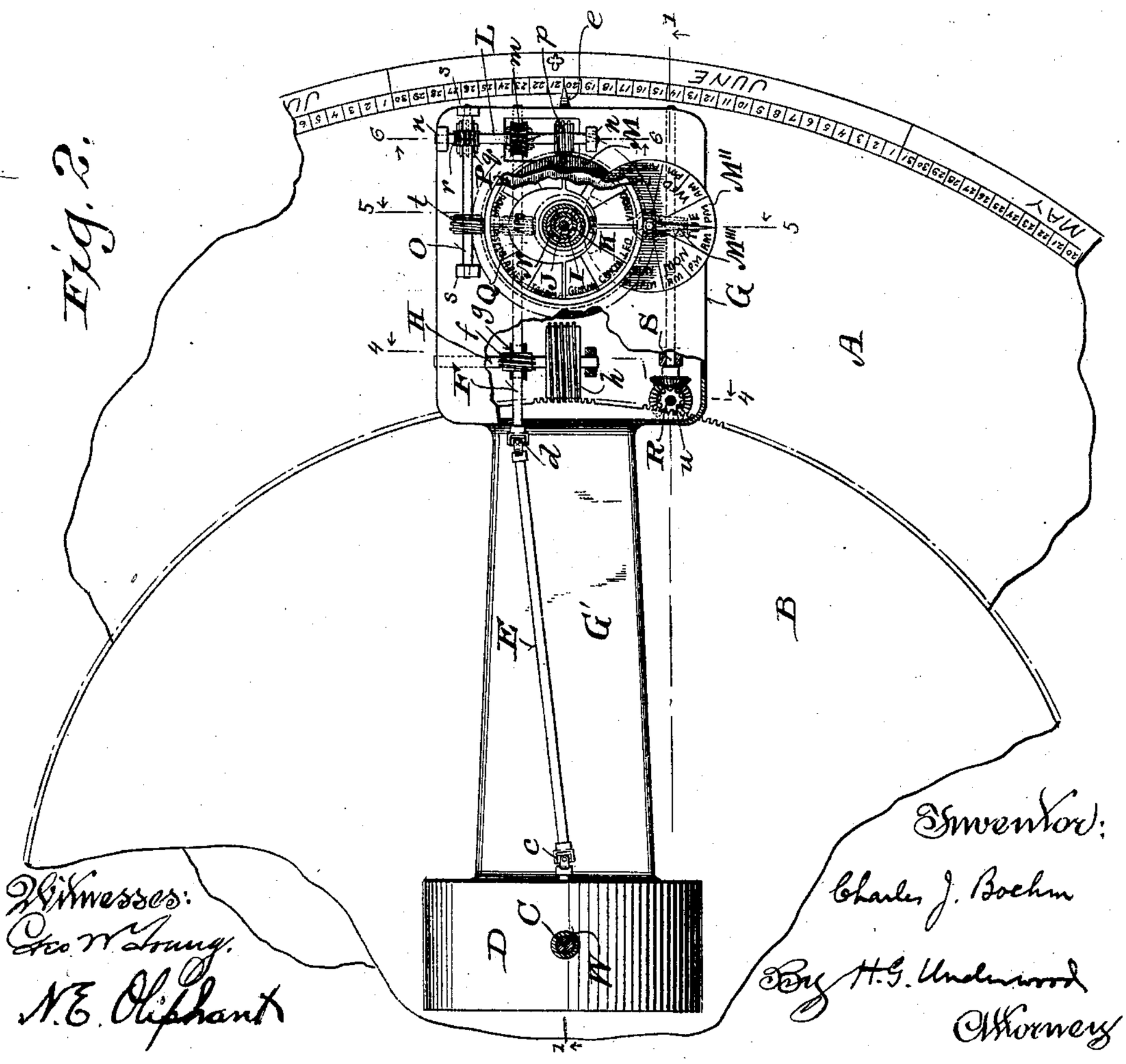


Fig. 2.



UNITED STATES PATENT OFFICE.

CHARLES J. BOEHM, OF MILWAUKEE, WISCONSIN.

TELLURIAN.

SPECIFICATION forming part of Letters Patent No. 637,226, dated November 21, 1899.

Application filed January 9, 1899. Serial No. 701,594. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. BOEHM, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Tellurians; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has for its particular object to improve the tellurian set forth in my United States Patent No. 613,111, issued October 25, 1898; and it consists in certain peculiarities of construction and combination of parts hereinafter specified with reference to the accompanying drawings and subsequently claimed.

Figure 1 of the drawings represents a partly-sectional elevation of my improved tellurian, the view being indicated by line 1 1 in the succeeding figure; Fig. 2, a plan view of a portion of the tellurian, partly broken and in horizontal section; Fig. 3, a detail plan view illustrating gear mechanism of said tellurian inverted; and Figs. 4, 5, and 6, detail sectional views, respectively, indicated by lines 4 4, 5 5, and 6 6 in the second figure of the series.

Referring by letter to the drawings, A indicates a preferably circular base, and at intervals of concentric circles thereon the months of one year and the numerical order of days in each month are denoted. The seasons and other calendarial matter may also be denoted in proper order on the base. A circular plate B is provided with a depending boss *b*, having a bottom flange made fast to the base A, central of the same, and the periphery of the plate is provided with teeth to the number of seven hundred and thirty, this being twice the number of days in one year.

Extending from the base A through the plate B central of the latter is a rigid post C, that constitutes a pivot for a clock D, the latter being of ordinary construction and serving as a motor for various coöperating gear mechanisms hereinafter specified.

The hour mechanism of the clock has universal-joint connection *c* with a rod E, that is also connected by a universal joint *d* with an arbor F, having its bearings in walls of a casing G, provided with a shank G′ in rigid connection with the clock-case. The casing G is provided with a pointer *e*, that travels in a circle above base A parallel to the circular space upon which the numerical order of days in months is displayed, and a supporting-wheel *e*′, loose on a stud within said casing, extends through a bottom slot of the same to bear upon the base aforesaid. A worm *f*, fast on arbor F, meshes with a twelve-tooth worm-pinion *g*, fast on another arbor H, rotative within casing G at right angles to the former arbor. A worm *h*, fast on the arbor H, meshes with the peripheral teeth of the plate B, and as there are two rotations of the pinion *g* each day of twenty-four hours the clock and mechanism in train therewith have a full automatic rotation with respect to a common axis (the pivot-post) once in one year, if said clock be kept running. Another worm *i*, fast on arbor F, meshes with a twenty-four-tooth worm-wheel *j*, rigid with a sleeve I, loose on a spindle J, stepped in the bottom of the casing G, this sleeve being within a hollow stationary post K, rising from the top of said casing. Arbor F is also provided with a worm *k* in mesh with a worm-pinion *m*, fast on another arbor L, mounted in bearing-lugs *n* on top of casing G at right angles to the former arbor, and another worm-pinion *p*, on arbor L, meshes with a fifty-nine-tooth worm-wheel M, rigid with a sleeve N, having loose fit on the hollow post aforesaid against a lower shoulder of same, this wheel being also meshed with a fourteen-tooth pinion M′, loose on a stud upon the top of casing G, but rigid with a dial M″, having the days of the week delineated thereon. The dial rotates under a pointer M‴, fast on the aforesaid stud, and each radial day-space on said dial is subdivided to show ante and post meridian.

The arbor L is also provided with a worm *q*, that meshes with a ten-tooth worm-pinion *r*, fast on another arbor O, mounted in bearing-lugs *s* upon the casing-top. Fast on arbor O is a worm-pinion *t* in mesh with worm-tooth peripheries of wheels P Q, the first of which has its hub in loose fit on sleeve N against a shoulder of same, this hub being also loose in the hub of the other wheel. The wheel P is provided with seventy-three teeth, but the wheel Q has eighty-four teeth. Therefore while both of these wheels rotate together the movement of one is faster than that of the other. The wheel P is timed for rotation

once in one year of three hundred and sixty-five days, while the wheel Q is timed to have a full rotation once in four hundred and twenty days.

Fast on a vertical arbor R, journaled in casing G, is a ten-tooth pinion *u* in mesh with the toothed periphery of plate B, and in miter-gear connection with said arbor is a horizontal arbor S, provided with a worm *v*, that meshes with a seventy-three-tooth worm-wheel T on spindle J, above specified. Fast on the upper end of the spindle is a bracket U, having the free outer end thereof in the form of a sleeve *w*, that constitutes a bearing for the axial rod V′ of an earth-globe V, the bearing and rod being at a fixed angle corresponding to the inclination of the earth to the plane of its orbit. A stop-collar *x* on rod V′ rests against the bearing-sleeve *w*, and a twenty-four tooth gear-wheel *y* on said rod meshes with a similar wheel of the same pitch fast on the upper end of sleeve I, provided with the twenty-four-tooth worm-wheel *j* in gear with arbor F, that derives motion from the clock, whereby the earth-globe is caused to have diurnal rotation on its axis, and as the rotation of the ten-tooth pinion *u* is transmitted to the seventy-three-tooth wheel T on spindle J said earth-globe is caused to make an annual revolution, whereby it has approach and recedence with respect to the sun-globe W, that is fast on a sleeve W′, fitting pivot-post C, that constitutes the axis for the clock, thus illustrating the change of seasons with respect to various portions of the earth's surface. The pinion *u* is of such length as will permit lifting clock and casing G high enough to bring pinion *h* out of gear with plate B, and therefore said clock and mechanisms in train therewith may be revolved by hand about said plate.

In miter gear with the upper end of the stationary hollow post K is the inner end of a shaft X, having its bearings in a bracket Y, loose on the sleeve N upon the hub of a seventy-eight-tooth wheel N′, rigid with said sleeve. A depending pointer *z* in pivotal connection with the bracket Y engages the toothed periphery of wheel N′, and thus said bracket is held to rotation with said wheel and corresponding sleeve, the latter being in timed gear with the arbor L aforesaid.

The outer end of shaft X is miter-geared to a squared vertical spindle Z′, having its bearings in the bracket Y, and in loose fit on the spindle is a moon-globe Z, supported by the forked outer end of a lever Z″ in pivotal connection with said bracket, the inner end of the lever being under against an inclined annular flange P′ on the hub of wheel P in timed gear with the arbor O above specified. The globe Z has one half thereof arbitrarily distinguished from the other half by any suitable means, so as to denote light and dark.

The clock being started and kept running, the various mechanisms above specified will operate in conjunction therewith, and the worm *h*, engaging the peripheral teeth of stationary plate B, will cause a rotation of said clock on its pivot-post once in one year, the periphery of said plate representing the orbit of the earth. As the clock rotates on its pivot-post the pointer projecting from casing G marks the days of each month, the months themselves, and such other calendarial matter as may be displayed upon the base, while at the same time the earth and moon globes have revolution about the sun-globe as well as rotation on their axes. The moon-globe is timed to have rotation on its axis once in twenty-nine and one-half days (approximately one lunar month) coincident with a revolution in the same period about the earth-globe, whereby the phases of the moon with respect to the earth are demonstrated. Incidental to travel of lever Z″ against the inclined annular flange P′ on the hub of wheel P vertical movement is imparted to the moon-globe to thus demonstrate the constantly-varying altitude of the moon with respect to the earth.

The fifty-nine-tooth wheel M moves the fourteen-tooth pinion two teeth in twenty-four hours, and dial M″, having the days of the week indicated thereon, is made to revolve once each week under the adjacent stationary pointer.

The clock with the other mechanisms may be set forward or back to correct time, and in case of leap-year said clock may be stopped for twenty-four hours or set back one day, starting again on the 28th of February, it being practical to move casing G and its connections around plate B without injury to the aforesaid clock or machinery in train therewith.

Inasmuch as the moon-globe is geared to make one rotation on its axis in twenty-nine and one-half days it is forty-four minutes and a fraction fast at the expiration of each lunar month, making a total gain of nine hours and a fraction in one year of three hundred and sixty-five days. Therefore I provide the seventy-eight-tooth wheel N′ and have the depending pointer *y*, in pivotal connection with the moon-bracket Y, engage said wheel, whereby each year said moon-bracket may be set back a distance equal to one notch of the aforesaid wheel to approximate the correct position of said moon-globe on its orbit with reference to the earth-globe in annual revolution.

Denoted in a circle upon the upper side of wheel P are the constellations of the zodiac, and the wheel Q being open the indices of said constellations are visible, the circle of these indices being under the pointer *z* in pivotal connection with the moon-globe bracket. Constituting part of the open wheel Q is an eccentric elliptical plate Q′, and the terminals of its major axis are marked to denote the apogee and perigee of the moon-orbit, the rotation of this wheel being timed with reference to the movements of the moon-

globe to illustrate the variations of distance between moon and earth at intervals of each lunar month.

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

1. A tellurian comprising a pivotal clock having annual rotation, a moon-globe in gear-train with the clock to have annual revolution about an earth-globe as well as rotation upon its own axis in periods of time approximating repetitions of a lunar month, a toothed wheel provided with delineations indicating the constellations of the zodiac, and a clock-driven pinion in mesh with the wheel to rotate the latter once in one year.

2. A tellurian comprising a pivotal clock having annual rotation, a moon-globe in gear-train with the clock to have annual revolution about an earth-globe as well as rotation upon its own axis in periods of time approximating repetitions of a lunar month, a toothed skeleton wheel having an eccentric elliptical portion the terminals of whose major axis correspond to the apogee and perigee of the moon-globe orbit, and a clock-driven pinion in mesh with the wheel the latter being timed to rotate once in four hundred and twenty days.

3. A tellurian comprising a moon-globe, means for imparting an annual revolution thereto about an earth-globe coincident with a rotation upon its axis in periods of time approximating repetitions of a lunar month, a peripherally-toothed wheel having the constellations of the zodiac indexed thereon, another peripherally-toothed wheel having an eccentric elliptical portion the terminals of whose major axis correspond to apogee and perigee of the moon-globe orbit, and a driving-worm in mesh with both wheels, the first of these wheels being timed for annual rotation and the other for rotation with reference to the movements of the moon-globe to illustrate variation of distance between moon and earth at intervals of each lunar month.

4. A tellurian comprising a clock, a swing-bracket in gear-train with the clock to have annual revolution, a moon-globe carried by the bracket and also in gear-train with the clock to have rotation upon its axis at intervals approximating repetitions of a lunar month, a seventy-eight-tooth wheel having movement in time with said bracket, and a wheel-engaging latch in connection with the aforesaid bracket.

5. A tellurian comprising a stationary peripherally-toothed circular plate, a clock in pivotal connection with the plate central of same and having its hour mechanism in gear with said plate, the gearing being timed to impart annual rotation to the clock, a sun-globe having the same center as the clock, an earth-globe and a support for same, gearing in train with the clock operative to impart diurnal rotation to the earth-globe, and annual revolution to its support, a swing-bracket in gear-train with the clock to revolve around the earth-globe, a moon-globe carried by the bracket and also in gear-train with the clock to have rotation on its own axis at intervals approximating repetitions of a lunar month, means for automatic variation of the moon-globe altitude, a seventy-eight-tooth wheel having movement in time with said bracket, and a wheel-engaging latch in connection with the aforesaid bracket.

6. A tellurian comprising a stationary peripherally-toothed circular plate, a clock in pivotal connection with the plate central of same and having its hour mechanism in gear with said plate, the gearing being timed to impart annual rotation to the clock, a sun-globe having the same center as the clock, an earth-globe and a support for same, gearing in train with the clock to impart diurnal rotation to the earth-globe and annual revolution to its support, a moon-globe in gear-train with the clock to revolve around the earth-globe and have rotation on its own axis at intervals approximating repetitions of a lunar month, means for automatic variation of the moon-globe altitude, other means for correcting annual gain in the travel of said moon-globe on its orbit with respect to true time of the moon, a gear-wheel provided with delineations indicating the constellations of the zodiac, another gear-wheel having the same center as the zodiac-wheel and an eccentric elliptic portion the terminals of whose major axis corresponds to the apogee and perigee of the moon-globe orbit, and a clock-driven worm in mesh with both of these wheels, the first of said wheels being timed to have annual rotation while the other is timed to have one full rotation in four hundred and twenty days.

7. A tellurian comprising a stationary peripherally-toothed circular plate, a clock in pivotal connection with the plate central of same and having its hour mechanism in gear with said plate, the gearing being timed to impart annual rotation to the clock, a sun-globe having the same center as the clock, an earth-globe and a support for same, gearing in train with the clock to impart diurnal rotation to the earth-globe and annual rotation to its support, a moon-globe in gear-train with the clock to revolve around the earth-globe and have revolution on its own axis at intervals approximating repetitions of a lunar month, means for automatic variation of the moon-globe altitude, other means for correcting annual gain in the travel of said moon-globe on its orbit with respect to true time of the moon, a gear-wheel provided with delineations indicating the constellations of the zodiac, another gear-wheel having the same center as the zodiac-wheel and an eccentric elliptic portion the terminals of whose major axis correspond to the apogee and perigee of the moon-globe orbit, a clock-driven worm-pinion in mesh with both of these wheels, the first of said wheels being timed for annual ro-

tation while the other is timed to have one full rotation in four hundred and twenty days; a days-of-the-week dial also in gear-train with the clock, and a stationary pointer adjacent to the dial.

8. A tellurian comprising a base having calendarial matter in circular arrangement thereon, a peripherally-toothed circular plate fast to the base central of same, a clock in pivotal connection with the center of the plate and having its hour mechanism in gear therewith, the gearing being timed to impart annual rotation to the clock, a sun-globe having the same center as the clock, an earth-globe and a support, for same, gearing in train with the clock to impart diurnal rotation to the earth-globe and annual revolution to its support, a moon-globe in gear-train with the clock to revolve around the earth-globe and have rotation on its own axis at intervals approximating repetitions of a lunar month, means for automatic variation of the moon-globe altitude, other means for correcting annual gain in the travel of said moon-globe on its orbit with respect to true time of the moon, a gear-wheel provided with delineations indicating the constellations of the zodiac, another gear-wheel having the same center as the zodiac-wheel and an eccentric elliptic portion the terminals of whose major axis correspond to the apogee and perigee of the moon-globe orbit, a clock-driven worm-pinion in mesh with both of these wheels, the first of said wheels being timed for annual rotation while the other is timed to have one full rotation in four hundred and twenty days, a days-of-the-week dial, also in gear-train with the clock, a stationary pointer adjacent to the dial, and another pointer movable with the clock adjacent to the calendarial matter on the base.

9. A tellurian comprising a stationary peripherally-toothed circular plate, a clock in pivotal connection with the plate central thereof and having its hour mechanism in gear with the toothed periphery of same, a gear-casing having a shank rigid with the clock, a hollow stationary post rising from the gear-casing, a sleeve loose in the post, a spindle loose in the sleeve and in gear-train with the clock to have rotation once in one year, a bracket fast to the spindle, an earth-globe having axial bearing in the bracket, clock-driven gear operating to rotate said sleeve once in twenty-four hours, gearing connecting the aforesaid sleeve and earth-globe axis to transmit the diurnal motion of one to the other, another sleeve loose on said post in gear-train with the clock to rotate once in approximately one lunar month, a rotarily-adjustable bracket held to rotation with the latter sleeve, a shaft having its bearings on the bracket and in gear with said latter sleeve, a spindle carried by the bracket in gear with said shaft, a moon-globe having movable fit on the latter spindle but rotative therewith, a zodiac-wheel having its hub loose on the outer sleeve, an apogee and perigee wheel loose on the hub of the zodiac-wheel, these wheels being peripherally toothed, a clock-driven worm in mesh with said wheels, an inclined flange on the hub of the apogee and perigee wheel, and a moon-globe-adjusting lever pivoted to said bracket to have contact with said flange.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

CHARLES J. BOEHM.

Witnesses:
N. E. OLIPHANT,
B. C. ROLOFF.