

F. S. BARNARD.
Terrestrial Time Globe.

No. 29,755.

Patented Aug. 28, 1860.

Fig. 2.

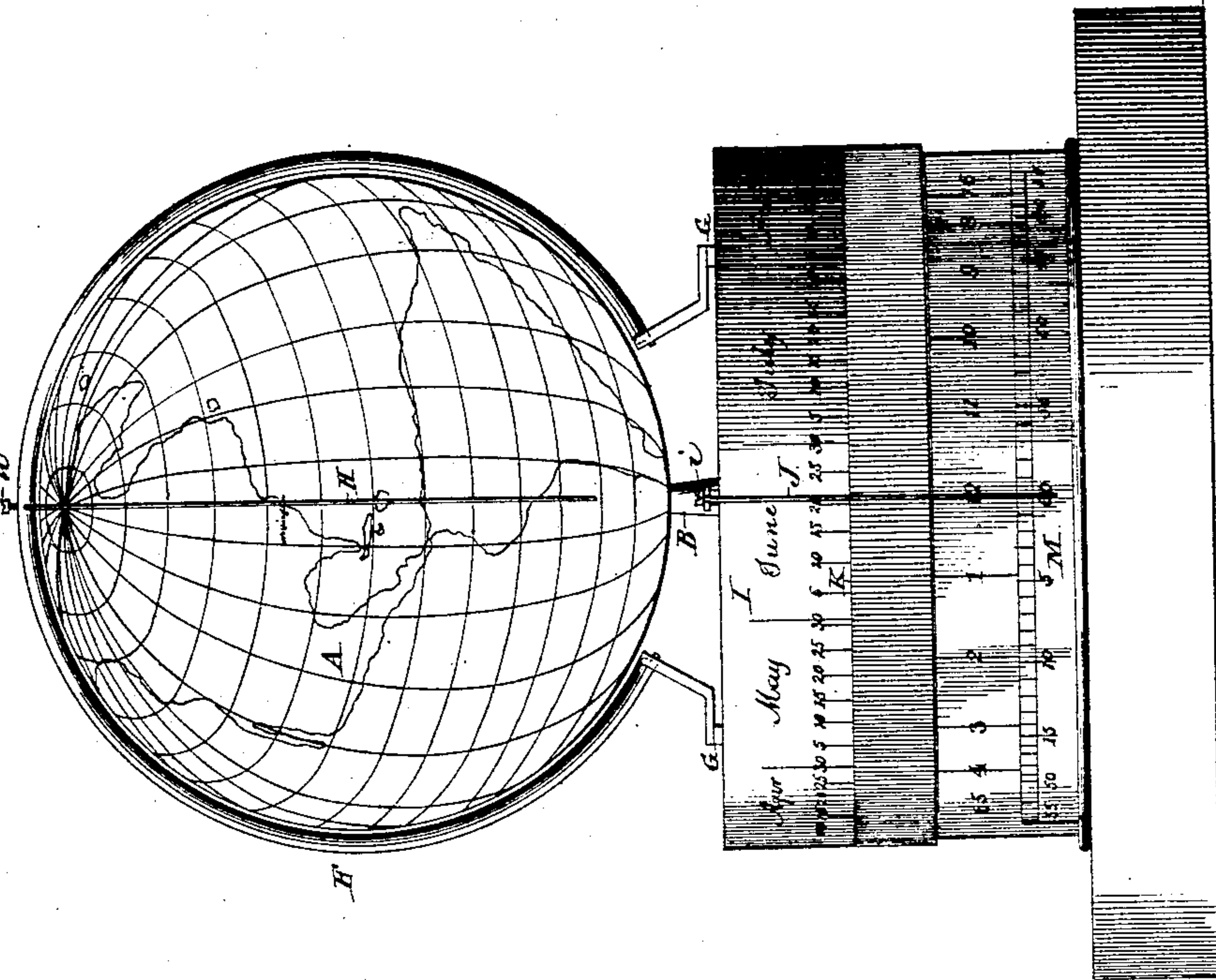
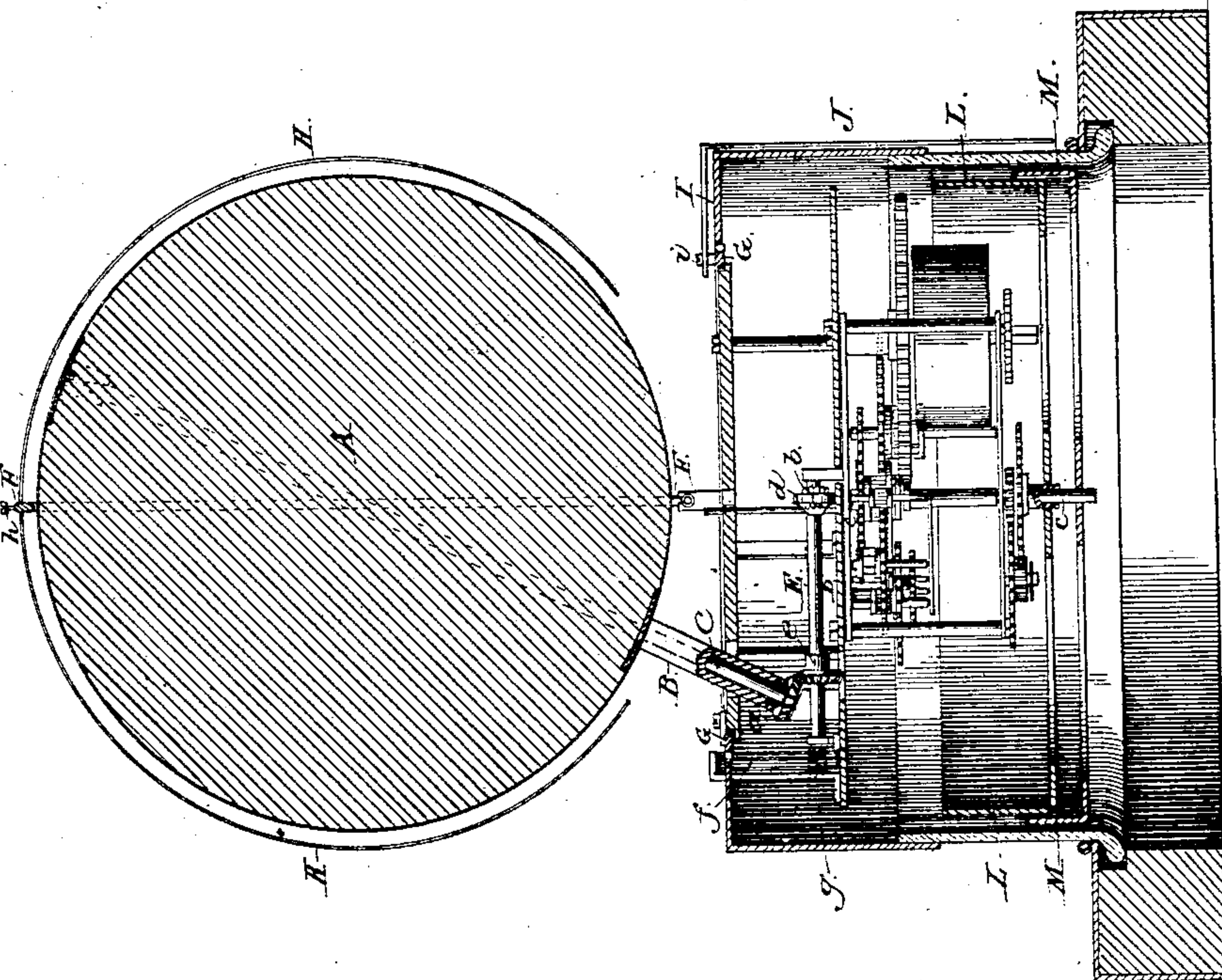


Fig. 1.



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FREDK. S. BARNARD, OF NEW YORK, N. Y.

AUTOMATIC TERRESTRIAL TIME-GLOBE.

Specification of Letters Patent No. 29,755, dated August 28, 1860.

To all whom it may concern:

Be it known that I, F. S. BARNARD, of the city, county, and State of New York, have invented the Terrestrial Time-Globe; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming a part of this specification, in which—

Figure 1 represents a vertical central section of my invention. Fig. 2, is a front elevation of the same.

Similar letters of reference in both views indicate corresponding parts.

The object of this invention, is to illustrate the position of my globe, in relation to the sun in all its variations during the 24 hours of a day and during the course of a year, and my invention consists first, in the combination with a clock movement of a terrestrial globe, which revolves once in 24 hours on an axis placed at an angle of $66\frac{1}{2}$ degrees toward the horizon, which latter represents the plane of the earth's orbit and from which rises a vertical bow encircling the globe and made to represent the sphere of light and shade or day and night on the revolving globe, in such a manner, that, the time of the day, the length of the days, and the time when the sun rises and sets, in any place on the globe can be determined at a glance; second, in the combination with the sphere of light and shade and with the revolving globe of an indicator encircling the globe in such a manner that by its position the position of the sun in relation to any part of the globe can be determined; third, in arranging on the toothed ring or year-wheel a fixed hand or pinion in combination with two rings attached to the center shaft of the clockwork one of which being divided into 24 equal parts and revolving once in 24 hours indicates the hours, while the other being divided into 120 equal parts, and revolving once in two hours, indicates the minutes, thereby enabling the observer to tell the correct time of the day in the same manner as by the aid of an ordinary clock.

To enable those skilled in the art to make and use my invention I will proceed to describe its construction and operation with reference to the drawing.

The globe A, is constructed in the ordinary manner, and it is provided with a tubular axis B, the center of which coincides

with the axis of the globe or with a line drawn through the poles. This tubular axis is fitted on a stationary pin C, which is fastened on the top plate of the clock movement D, and which is inclined at an angle of $66\frac{1}{2}$ degrees toward the horizon. A bevel wheel *a*, is placed into the lower end of the tubular axis B, of the globe so that the friction of its hub is sufficient to cause the globe to rotate with the wheel and allowing at the same time of turning the globe in either direction in order to set it according to the place of the earth, in which the time globe is to be used.

A rotary motion is imparted to the globe by means of a horizontal shaft E, which is made to rotate once in 24 hours by a worm screw *b*, secured to the top end of the central shaft *c*, of the clock movement and gearing into a small wheel *d*, containing 24 teeth, and fastened to one end of the horizontal shaft E, and by a bevel wheel *e*, gearing into the wheel *a*, in the lower end of the tubular axis B, of the globe and containing the same number of teeth with this wheel.

The globe is encircled by a bow F, which is secured in a vertical position to a toothed ring G, which is made to rotate once in a year by a pinion *f*, to which motion is imparted by a worm screw *g*, on the end of the horizontal shaft E. The motion of this bow as well as that of the globe is so arranged that it takes place from east to west or from the left to the right, and it will be noticed that if the sun is assumed to stand at a great distance on a horizontal line drawn through the center of the bow F, and at right angles to the plane of this bow, said bow represents the sphere of light and shade or of day and night on the globe. And by imparting to this sphere of light and shade a yearly motion around the revolving globe A, the yearly motion of the earth around the sun is illustrated in a very simple and ingenious manner. The position of this bow in relation to the globe changes from day to day, and on the longest and shortest days it will intersect the meridian drawn in a plane at right angles to the plane of the bow at a distance of $23\frac{1}{2}$ degrees from the poles showing that the difference between the duration of day and night on the whole globe is at its maximum the days being longest on one, and shortest on the other half of the globe, whereas in the equinoxes the plane of the bow passes through the poles bisecting the

globe in two equal parts and showing that day and night are of equal length all over the globe.

An indicator or pointer H, is secured to the bow by means of a set screw *h*, or in any other convenient manner, in a plane at right angles to the plane of the bow, and bisecting the latter in two equal parts. This indicator points out at all times the position of the sun in regard to the globe, and it will be readily understood that in all places on the globe situated at a certain moment in the same plane with this indicator, and on the hemisphere of light the time of the day is exactly 12 o'clock at noon, whereas in all places on the globe situated at a certain moment in the same plane with this indicator and on the hemisphere of shade it is exactly midnight. And if one of the parallel circles of the globe be divided into 24 equal parts and marked with the appropriate figures, the indicator H, will point out the time of the day. This mode of indicating the time of the day will however be advisable only for large globes.

The toothed ring G rotates in a recess in the top plate of the stand I, and a pointer or hand J, is secured to its upper surface by means of a set screw *i*. This hand is situated in a plane coinciding with the plane of the indicator H, or it may be a continuation of the same, and it sweeps over a series of marks K, on the side of the stand which represent the days of the months and which are numbered according to the lengths of the different months, as clearly shown in Fig. 2. Another series of marks indicating the days of the week might be inscribed on the side of the stand or on a separate ring having an independent rotary motion from the stand so that it can be set at the end of each year to bring the proper day of the week under the hand J, said hand also serves to point out the hours and minutes, the hours being marked on a ring L, that is attached to the lower end of the center shaft *c*, of the clock movement in a similar manner to the hour hand of an ordinary clock and the minutes being marked on a ring M, which rotates with the center shaft *c*, in a similar manner to the minute hand of an ordinary clock or watch. These rings are so arranged that they rotate from left to right and they are geared up so that

the hour makes one revolution in 24 hours and the ring M, one revolution every two hours. An extra ring might be attached to point out the seconds if it should be deemed desirable.

It is obvious that by a suitable arrangement of gear wheels the motions of the several parts of my time globe might be made mathematically correct and I have endeavored only to simplify the machinery as much as possible so as to reduce the price, and to enable every person taking any interest in the motion of our globe and its relation to the sun, to buy one of my time globes, and to use it to his own advantage and amusement and for the instruction of his children.

A time globe constructed as herein described can be sold at a moderate price and it will greatly facilitate the task of illustrating the relation of our globe to the sun, and it will also assist in exterminating the erroneous ideas still existing among the uneducated portion of the people in regard to the daily and yearly motion of the earth.

The rings on which the hours and the minutes are marked will be made in future in the same manner and of the same material as the globes.

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

1. The arrangement in combination with the clock movement D, of a revolving terrestrial globe A, on an inclined axle C, and encircled by a bow F, constructed and operating substantially as and for the purpose set forth.

2. The arrangement of the indicator H, in combination with the revolving globe A, and with the bow F, constructed and operating substantially in the manner and for the purpose specified.

3. The arrangement of the fixed hand or pointer J, on the toothed ring G, in combination with the rotary rings L, and M, or their equivalents constructed and operating substantially, as and for the purpose set forth.

FREDK. S. BARNARD.

Witnesses:

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