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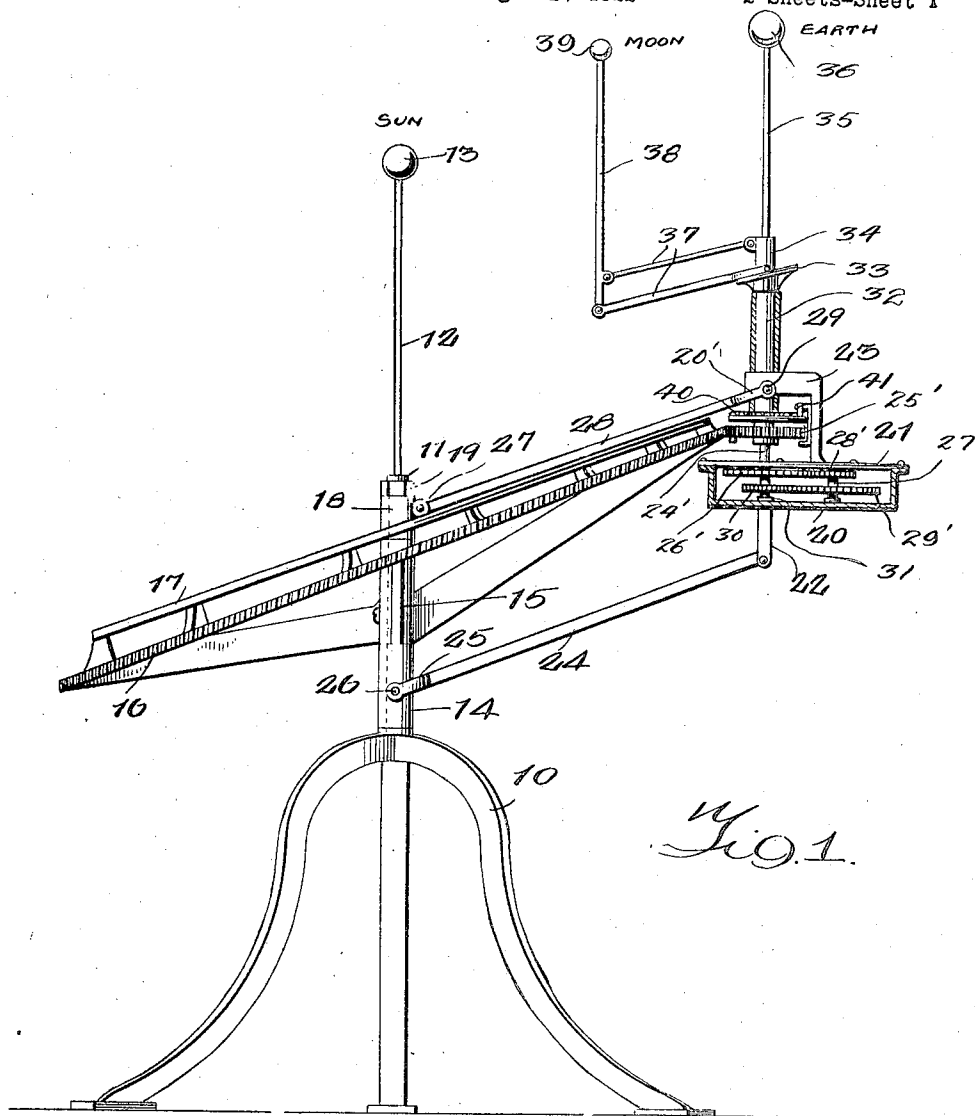
B. F. BOUNDS

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TERRESTRIAL PLANETARIUM

Filed Aug. 21, 1922

2 Sheets-Sheet 1



WITNESSES
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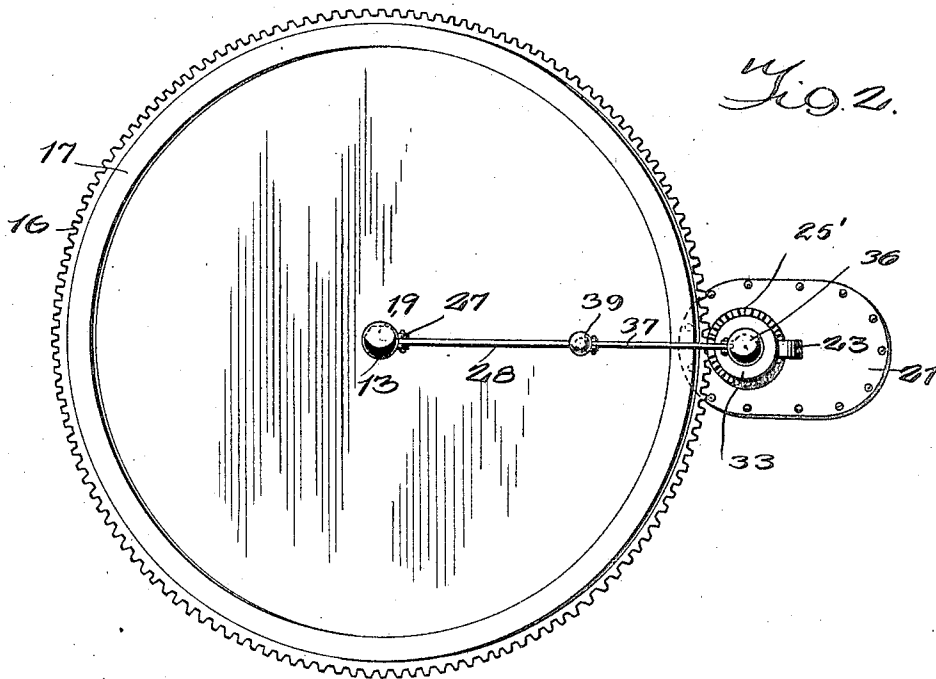
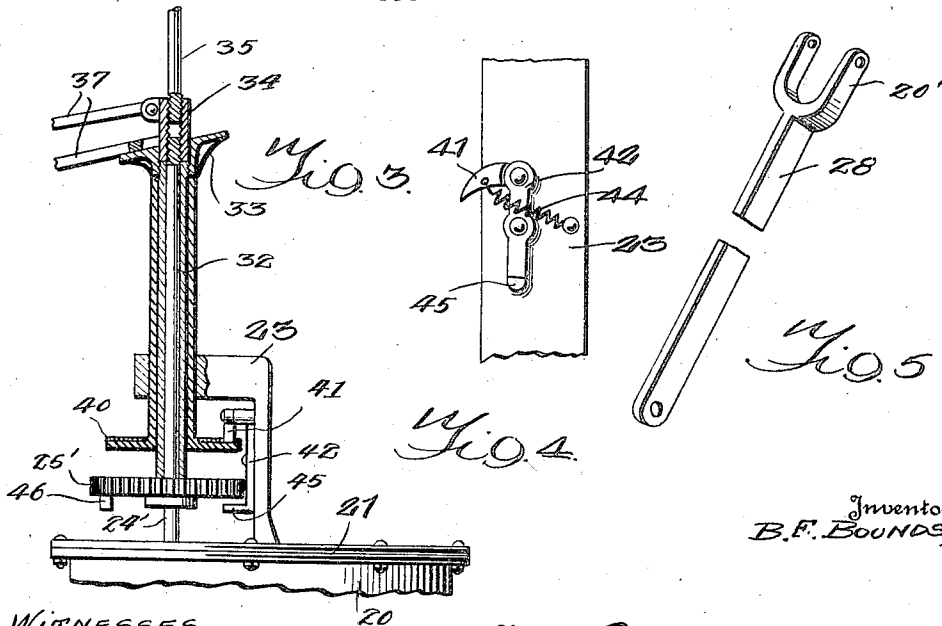
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UNITED STATES PATENT OFFICE.

BENJAMIN F. BOUNDS, OF PONDCREEK, OKLAHOMA.

TERRESTRIAL PLANETARIUM.

Application filed August 21, 1922. Serial No. 583,300.

To all whom it may concern:

Be it known that I, BENJAMIN F. BOUNDS, a citizen of the United States, residing at Pondcreek, in the county of Grant and State of Oklahoma, have invented certain new and useful Improvements in Terrestrial Planetaria, of which the following is a specification.

This invention relates to astronomical instruments and has special reference to a terrestrial planetarium.

One important object of the invention is to improve the general construction of devices of this character.

A second important object of the invention is to provide an improved actuating mechanism for maintaining representation of the sun, earth and moon used therewith in their proper relative position.

A third important object of the invention is to provide a novel arrangement of this character wherein the phases of the moon may be shown and also wherein the movements of the moon which result in solar and lunar eclipses, are shown.

With the above and other objects in view as will be hereinafter apparent, the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings and specifically claimed.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and:—

Figure 1 is a side elevation of the complete device.

Figure 2 is a plan view thereof.

Figure 3 is a section taken vertically through the upper part of the moving elements which support the representation of the earth.

Figure 4 is a detail section of a certain pawl, and trip used herewith.

Figure 5 is a perspective view of one of the parallel motion arms used herewith.

In carrying out this invention there is provided a stand having legs 10 and extending upwardly from this stand is a shaft 11 on the upper end of which is screwed a shaft or staff 12 having a ball 13 at its top to represent the sun. On the shaft 11 immediately above the base 10 is a rotatable sleeve 14 and fixed on the shaft above this sleeve is a frame 15 whereon is mounted a gear ring 16 inclined at an angle of sub-

stantially 25 degrees to the horizontal. This frame 15 also carries a guide ring or cam 17 which is inclined at $23\frac{1}{2}$ degrees to the horizontal in like manner as the axis of the earth is inclined to the plane of the ecliptic. On top of the hub of the frame 15 is fitted a second sleeve 18, a nut 19 being screwed on the upper end of the shaft 11 to hold said sleeve in position. At 20 is a gear casing having a cover 21 and from the bottom of this gear casing extends downwardly an arm 22 while a similar arm or bracket 23 extends upwardly from the cover. A link 24 is pivotally connected at one end to the lower end of the arm 22 and is provided at its other end with a fork 25 embracing the sleeve 14 and pivoted on pintles 26 projecting therefrom. On the sleeve 18 is formed an ear 27 wherto is pivoted one end of an arm or link 28 having its other end forked as at 20' and pivotally mounted on pintles 29 carried by the bracket 23. At 24' is shown a hollow shaft which has at its upper end a gear 25' meshing with the gear 16 and the teeth on these gears are in the proportion of 495 to 40. At its lower end, which extends into the gear casing, there is fixed on the shaft 24' a gear 26' which preferably has 76 teeth. At 27' is a stub shaft or counter shaft which carries a gear 28' meshing with the gear 26' and having 14 teeth. Revolving with the gear 28', being preferably formed integral therewith is a gear 29' having 76 teeth and this gear meshes in turn with a gear 30 fixed on a shaft 31 the lower end of which is received in a foot-step bearing in the gear casing. This shaft 30 extends upward through the shaft 24. Journalled on the shaft 24' is a sleeve 32 whereon is fixed a cam plate 33 inclined at an angle of 15 degrees to the horizontal. Above this cam plate is mounted a sleeve 34 which is fixed on the upper end of the shaft 24. The shaft 30 has screwed into its upper end a shaft 35 carrying at its upper extremity a sphere 36 representing the earth. Pivoted in spaced relation on the sleeve 34 are paralleled motion links 37 which have their ends connected to a vertical shaft 38 carrying at its upper end a sphere 39 representing the moon. Fixed on the sleeve 32 is a ratchet 40 which is engaged by a pawl 41 pivotally mounted on the upper end of a trip lever 42 pivoted on the bracket 23 and held in engagement with the ratchet by a spring 44. This trip lever has an end 45 which

extends beneath the gear 25 and is engaged by a tooth 46 projecting downward from that gear each time the gear makes a complete revolution. The ratchet is provided with the proper number of teeth to cause it to make one revolution in the reverse direction as the gear case 20 makes one complete revolution about the shaft 11.

From the foregoing it can be seen that the various parts are arranged to make certain revolutions or orbital movements, the one about the other. For instance, the gear casing may be moved around the shaft 14 and in such movement the globe 36 will not only travel around a vertical axis passing through the sun globe 13 but will rise and fall since the link 28 will contact with the cam 17. At the same time this movement will cause rotation of the gear 25' about its axis and will consequently rotate the sleeve 34 and thus carry the moon globe around the earth. Owing to the cam 33 the moon globe will rise and fall relative to the earth in like manner to the rising and falling of the earth globe relative to the sun. Now the proportion of the gears is such that the globe representing the earth revolves $29\frac{1}{2}$ times while the globe representing the moon makes one revolution about the earth globe. At the same time the cam 33 is revolved once with each revolution of the earth globe about the sun globe so that the inclination of this cam to the vertical axis passing through the sun remains constant. Thus the motions of the earth and moon with respect to the sun and to each other are simulated in the manner which is essentially correct, and the device can be used in school rooms and the like to clearly illustrate these phenomena and the attendant phenomena of eclipses both of the sun and moon.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the spirit thereof. It is not, therefore, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

I claim—

1. In a device of the kind described, a vertical shaft having a globe representing the sun at its top, a pair of sleeves on said shaft, a pair of parallel motion links each pivoted to a respective sleeve, a support carried by the outer ends of said arms, a shaft mounted vertically in said support, an inclined cam whereon one of said links rest, an inclined gear ring having the first men-

tioned shaft extending through its center, gearing for revolving the second shaft including a pinion meshing with said inclined gear ring, and a globe representing the earth at the top of said second shaft.

2. In a device of the kind described, a vertical shaft having a globe representing the sun at its top, a pair of sleeves on said shaft, a pair of parallel motion links each pivoted to a respective sleeve, a support carried by the outer ends of said arms, a shaft mounted vertically in said support, an inclined cam whereon one of said links rest, an inclined gear ring having the first mentioned shaft extending through its center, a sleeve on the second shaft, a pair of parallel motion links supported on said sleeve, a cam plate surrounding and inclined to the second shaft and having one of the last mentioned links resting thereon, a vertical shaft carried by the last mentioned link, globes on the top of the second and last mentioned shafts representing the earth and moon respectively, a pair of gears on the last mentioned sleeve one of which meshes with the gear ring, to rotate said sleeve, and a gear train driven by the other of said pair of gears and driving the second shaft.

3. In a device of the kind described, a vertical shaft having a globe representing the sun at its top, a pair of sleeves on said shaft, a pair of parallel motion links each pivoted to a respective sleeve, a support carried by the outer ends of said arms, a shaft mounted vertically in said support, an inclined cam whereon one of said links rest, an inclined gear ring having the first mentioned shaft extending through its center, a sleeve on the second shaft, a pair of parallel motion links supported on said sleeve, a cam plate surrounding and inclined to the second shaft and having one of the last mentioned links resting thereon, a vertical shaft carried by the last mentioned links, globes on the top of the second and last mentioned shafts representing the earth and moon respectively, a pair of gears on the last mentioned sleeve one of which meshes with the gear ring, to rotate said sleeve, and a gear train driven by the other of said pair of gears and driving the second shaft, and means to rotate the cam plate as the support is moved around the first shaft, said means being arranged to maintain said cam plate in fixed angular relation to the axis of the first shaft.

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

BENJAMIN F. BOUNDS.

Witnesses:

VICTOR H. INGRAM,
H. J. PRINCE.