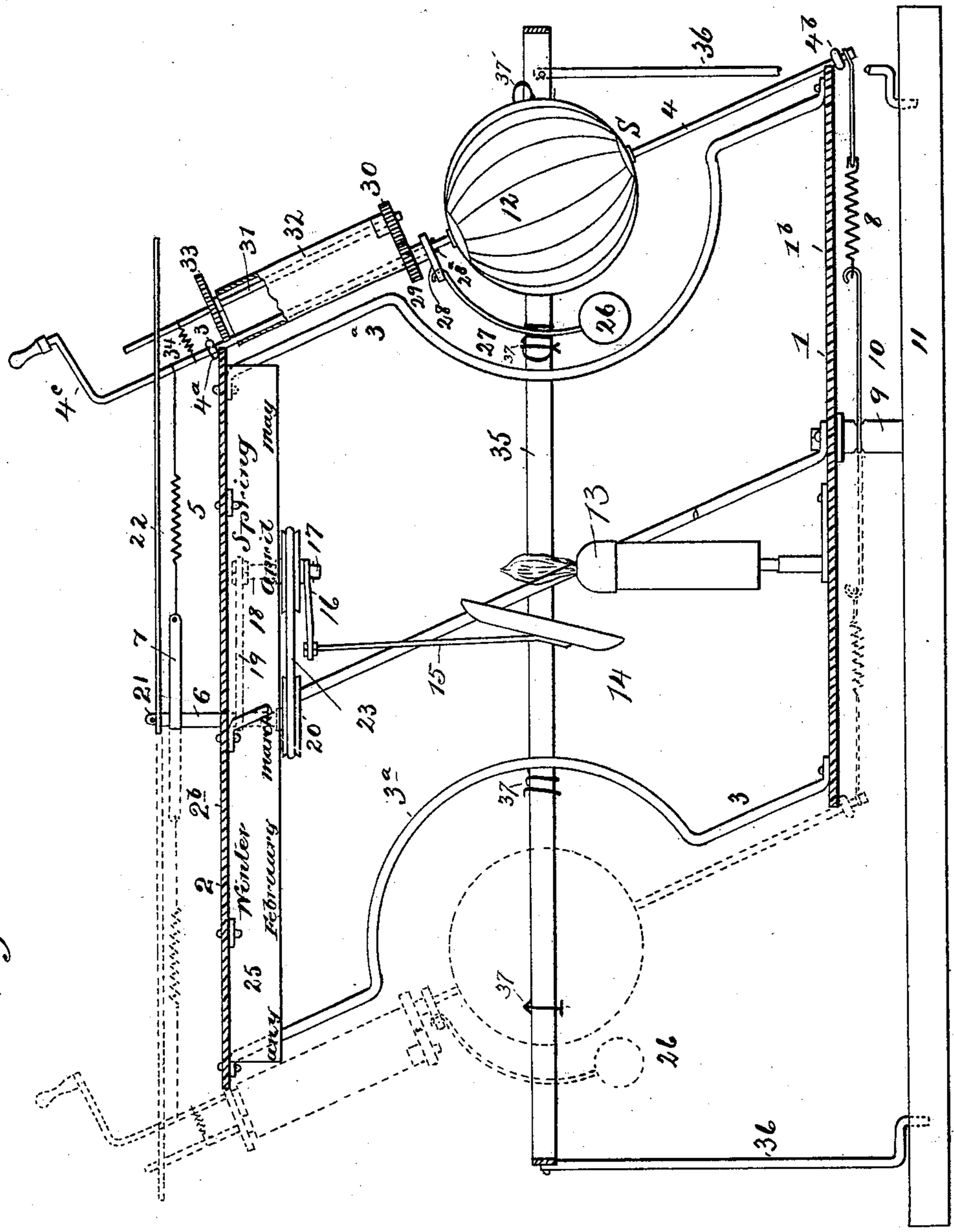
No. 627,697. Patented June 27, 1899.

S. KRISTIAN.

TELLURIAN.

(Application filed Apr. 4, 1899.)

(No Model.) 3 Sheets—Sheet 1.



WITNESSES

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Fig. 2.

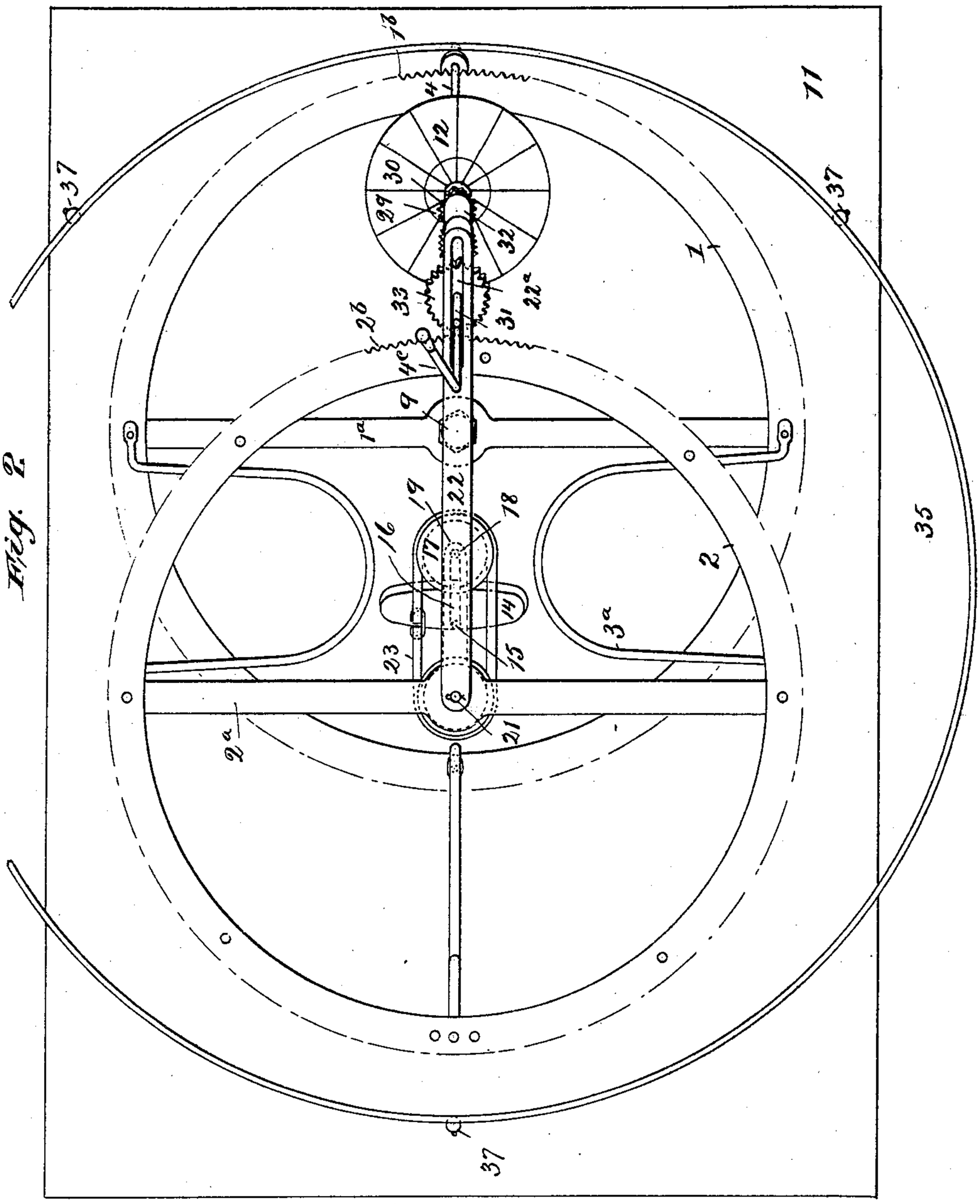

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Fig. 3.

Fig. 4.

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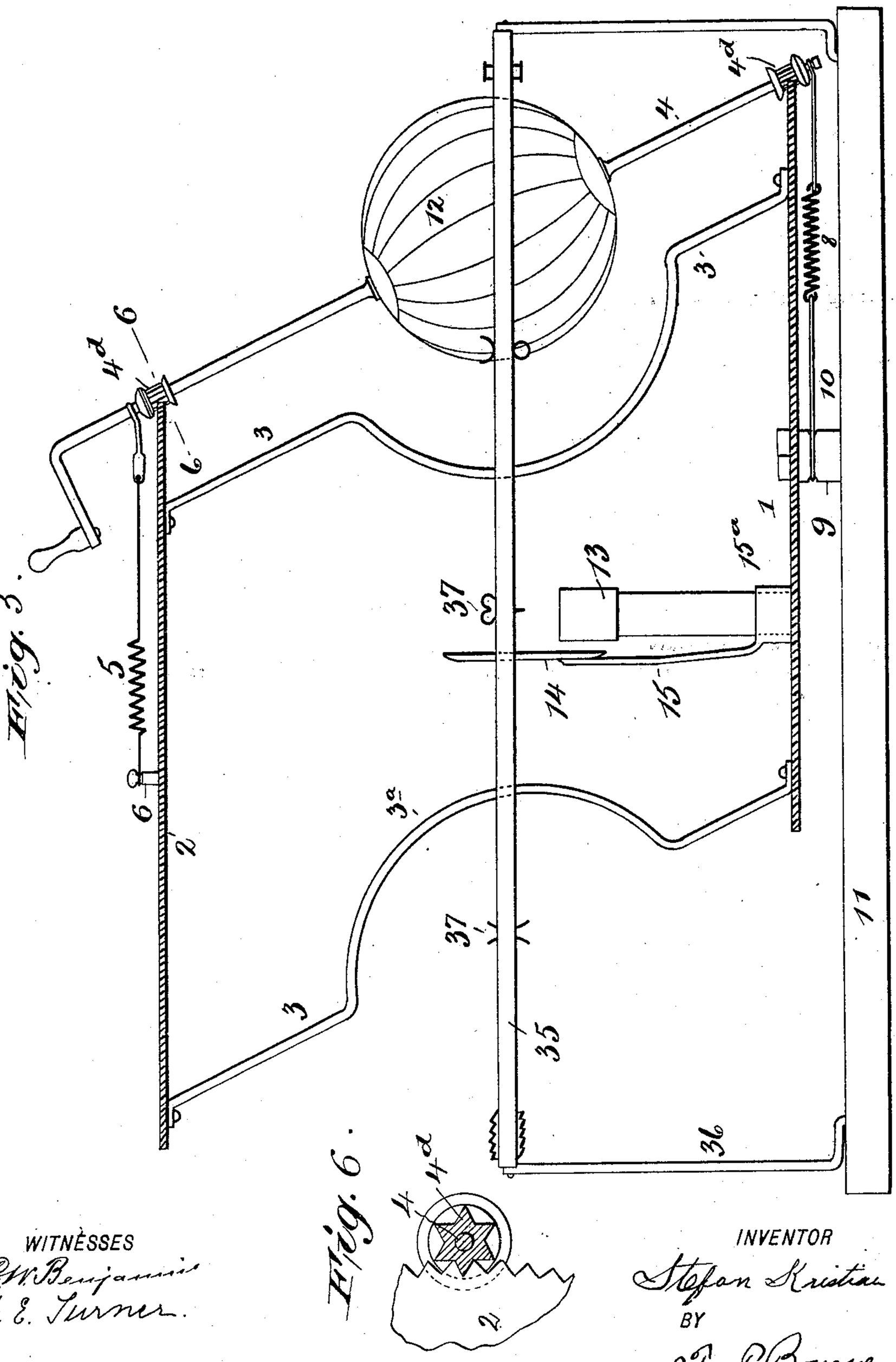

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

STEFAN KRISTIAN, OF NEW YORK, N. Y.

TELLURIAN.

SPECIFICATION forming part of Letters Patent No. 627,697, dated June 27, 1899.

Application filed April 4, 1899. Serial No. 711,658. (No model.)

To all whom it may concern:

Be it known that I, STEFAN KRISTIAN, a citizen of the United States, residing in New York city, borough of Manhattan, State of New York, have invented certain new and useful Improvements in Tellurians, of which the following is a specification.

The object of my invention is to provide means for clearly illustrating to an observer the position of the earth relatively to the sun during its diurnal revolutions and also in its passage through its orbit, particularly illustrating the declination of the earth relatively to the sun during the solstices, as well as during the periods between the summer and winter solstices.

Another object of the invention is to illustrate the travel of the moon around the earth and the positions of the moon relatively to the earth and the sun to indicate the light and dark phases of the moon.

The invention consists in the novel details of improvement and the combinations of parts that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part hereof, wherein—

Figure 1 is a side elevation of a tellurian embodying my invention. Fig. 2 is a plan view thereof. Fig. 3 is a sectional detail on the plane of the line 3 3 in Fig. 1, showing the means by which the terrestrial globe is given its apparent diurnal revolution and its travel through its orbit and the moon is given its movement around the earth. Fig. 4 is a similar view showing the operating-shaft in a different position. Fig. 5 is a side elevation of a small form of tellurian embodying my invention, and Fig. 6 is a sectional detail on the line 6 6 in Fig. 5.

Similar numerals of reference indicate corresponding parts in the several views.

1 2 indicate guides, which may be in the form of rings, disks, or plates supported one above the other, as by intermediate posts or the like 3, the centers of which guide rings or disks are eccentric to each other, so that the upper one will project outwardly beyond the lower one, as clearly shown in the drawings. The parts 1 2 are shown in Fig. 2 in the form of annular rings connected by cross-bars 1^a 2^a, although the parts 1 2 could be elliptical, if preferred. The posts 3 are shown inwardly curved at their mid-portions at 3^a to permit the free travel of a globe around the rings or disks 1 2. The rings or disks 1 2 are provided, preferably on their peripheries, with teeth 1^b 2^b, shown inclined at an angle coincident with a line passing through the overlapping edges of the rings 1 2. By preference there are three hundred and sixty-five of such teeth on each ring or disk, each corresponding to one day of the year.

4 is a shaft extending between the rings or disks 1 2 and lying against the peripheries thereof at an angle to the plane of the surface of said disks, which angle is produced by the extent to which one ring projects beyond the other, and the shaft 4 is adapted to travel around said rings or disks. I have shown the shaft 4 provided with an enlargement 4^a above ring 2 and an enlargement 4^b below ring 1 to keep the shaft from longitudinal movement. The shaft 4 is shown held against the rings or disks 1 2 by means of springs, a spring 5 being pivotally connected at one end to said shaft and at its other end connected to rotate around a standard 6, supported by cross-bar 2^a, a strap 7 being shown mounted on said standard and connected to said spring and a spring 8 swiveled to the shaft 4 near its lower end and at its other end pivotally connected to a standard 9, as by a link 10, swiveled on said standard. Thus as the shaft 4 travels around the rings or disks 1 2 the springs 5 8 keep it in contact therewith and travel around with the same, as shown by dotted lines in Fig. 1. The shaft 4 is shown provided with a crank-handle 4^c for rotating it. A standard 9 is shown attached to a base 11, to which posts 3 are secured, and the ring or disk 1 is attached to said standard by means of the cross-bar 1^a, the operative parts of the device thus being supported by said standard. To shaft 4 is attached a globe 12, preferably a terrestrial globe. Each axial revolution of shaft 4 and globe 12 represents a diurnal revolution of the earth on its axis. In the preferred form of my device the shaft 4 and the globe 12 during each axial rotation have a movement of translation around the rings or disks 1 2 the one three-hundred-and-sixty-fifth part of the circumference of said rings, which cor-

responds to a diurnal movement of the earth in its orbit. To cause this movement of translation of shaft 4 the space of one tooth of the rings for each complete revolution of the shaft, I provide a longitudinally-extending groove 4^c in the shaft near each end, one in line with ring 1 and the other in line with ring 2, which grooves are adapted to receive the teeth upon said rings, as shown in Figs. 3 and 4, the edges of which grooves act as teeth upon the teeth of the rings. When the shaft is in the position shown in Fig. 3, a tooth of each ring will be in the groove 4^c. When the shaft is rotated, the metal at one edge of each groove will act on the adjacent tooth to advance the shaft the space of one tooth, whereupon the circular portion of the shaft will ride between two teeth, as shown in Fig. 4, during which time the shaft and globe are rotating without advancing (which represents the diurnal rotation of the earth) and when the groove 4^c reaches the next tooth the shaft will be advanced the space of another tooth, these spaces representing the diurnal translation of the earth in its orbit. Thus when the shaft has been rotated three hundred and sixty-five times it will have traveled completely around the rings 1 2 and will likewise have made three hundred and sixty-five revolutions on its axis. The grooves 4^c at both ends of shaft 4 act on teeth 1^b 2^b simultaneously, thus keeping the shaft in the proper position at all times.

In order to represent the light and dark portions of the earth caused by the light from the sun, I provide a suitable lamp or candle 13, which may be supported in any suitable manner and within the line of travel on the orbit of the globe 12, and to throw the light directly upon the globe I provide a reflector 14, that is so located that the light will be between it and the globe. The reflector 14 is caused to travel around the light 13 as the globe travels around the latter, for which purpose the stem 15 of the reflector is shown depending from a crank-arm 16, attached to a pulley 17, mounted to rotate on a stud 18, carried by an arm 19, supported by and projecting from cross-bar 2^a. 20 is a pulley carried by a shaft 21, journaled in a bore in standard 6, and 22 is an arm secured to said shaft and projecting horizontally over and beyond ring or disk 2. The outer end of arm 22 is connected with shaft 4, so that as the latter travels around the rings 1 2 the arm 22 will be carried around thereby, and for this purpose I have shown the outer end of said arm slotted at 22^a to receive said shaft.

23 is a belt passing around pulleys 17 and 20, and the arrangement is such that as arm 22 is carried around by shaft 4 crank 16 will be rotated, and thus the reflector 14 will be carried around the light 13, the positions and movements of the parts being such that whatever the position of globe 12 the reflector 14 will face the same to reflect the light upon it.

It is evident that other means than belt and pulleys may be used for communicating motion from arm 22 to the reflector 14.

In order to indicate the different seasons and also the different months within those seasons with respect to the position of the globe relatively to the sun, I provide a band or the like 25, which depends from the ring or disk 2, upon which are located the proper words or symbols, as shown in Fig. 1. If preferred, however, these words or symbols can be placed upon the top of the ring or disk.

From the foregoing description it will be understood that when the globe is in the position shown in Fig. 1 the summer solstice of the northern hemisphere will be represented, because the declination of the earth relatively to the light 13 is such that the north pole N is nearest the light and the south pole S is farthest therefrom, and when the globe is in the position shown in dotted lines in Fig. 1 the winter solstice of the northern hemisphere will be represented, because the north pole is farthest from the light and the south pole is nearest to the light. In the intermediate positions of the globe between those shown in Fig. 1 the declination or position of the earth relatively to the sun will be illustrated according to the seasons and months corresponding to the point around the peripheries of the rings 1 2 to which the globe may be adjusted. Thus by having the axis of the globe inclined to a horizontal plane passing through the light and by moving the globe bodily around the light the daily positions of the earth relatively to the sun can be observed for any day of the year. By placing the shaft 4 in line with teeth 1^b 2^b corresponding to any desired day of the year and then rotating said shaft the globe can be moved to a position corresponding to different hours of the day.

In the preferred form of my device I provide a sphere or globe 26, corresponding to the moon, and so support and actuate the same that it will travel around the earth once for twenty-eight revolutions of shaft 4, meaning once in twenty-eight days. For this purpose I have shown the sphere 26 as carried by an arm 27, projecting from a bracket 28, secured to a gear 29, journaled on shaft 4, and the gear 29 is in mesh with a gear 30, carried by a shaft 31, that passes through a guide 32 on shaft 4. A pin 28^a on shaft 4 keeps the parts in their proper position upon the shaft above globe 12. The shaft 31 carries a toothed wheel 33, whose teeth bear against shaft 4, a spring 34, connecting shafts 4 and 31, serving to keep the wheel 33 in engagement with said shaft, while permitting shaft 31 to have lateral movement. The teeth of wheel 33 are adapted to enter the groove 4^c at the upper part of shaft 4 in manner described with relation to teeth 2^b, and the arrangement is such that each time shaft 4 is rotated the groove 4^c will cause wheel 33 to move the space of one tooth, as shown in Figs. 3 and 4. The arrangement of the gearing is such that each time shaft 4

is rotated the sphere or globe 26 will be moved a distance corresponding to the movement of translation of the moon in one day through its orbit around the earth, so that when shaft 4 has been rotated twenty-eight times the globe 12 will have moved in its orbit around the light 13 a distance corresponding to twenty-eight days, and the moon will likewise have been carried completely around globe 12, while at the same time it travels with the globe 12 around the light. I have shown the guide 32 in the form of a shell or casing, through which the shafts 4 and 31 freely pass, the gears 29 30 keeping the shafts separated at the lower part, and shaft 31 passes through slot 22^a in arm 22, shafts 4 and 31 being thus kept in proper relative positions. From the foregoing it will be understood that as the sphere or globe 26 travels around the globe 12 the manner in which the phases of the moon are caused can be readily seen. Thus when the globe 26 travels into certain positions relatively to globe 12 and light 13 the light will be thrown upon globe 26 more or less, and when the latter reaches other positions relatively to the globe 12 and light 13 the presence of globe 12 between 13 and 26 will prevent more or less of the light from being thrown on the globe 26.

In order to illustrate the zodiac and its signs, I provide a girdle 35, which surrounds the path of globe 12 and is shown supported by posts 36, rising from the base 11, and upon this girdle 35 are placed the signs of the zodiac 37 (see Figs. 1 and 5) in proper positions relatively to the position of the words or symbols indicating the months and seasons. By this means when the globe 12 travels through its orbit or path it can be determined by inspection in what part of the zodiac the earth may be at a given season or time of the month.

In Figs. 5 and 6 I have shown a simplified form of the device in which the arrangement of the main features is substantially similar to that before described, but the sphere 26 is dispensed with, the reflector 14 is not actuated by the rotation of shaft 4, and the means for causing the shaft 4 to travel around the rings 1 2 is slightly modified in that instead of having a groove 4^c to cause the shaft to rotate once on its axis for each tooth of the rings 1 and 2 that are passed the shaft is shown provided with pinions 4^d, having a plurality of teeth, so that for each complete revolution of the shaft 4 it will pass around a plurality of teeth on rings 1 2. The stem 15 of the reflector 14 is provided with a collar 15^a, that surrounds the stem of the light 13 and can be adjusted by hand when desired to throw the light upon the globe 12. This construction enables a cheaper article to be produced than that shown in Figs. 1 to 4 and one that is simpler for young children to comprehend.

I do not limit my invention to the precise details of construction shown and described, as they may be varied without departing from the spirit thereof—as, for instance, instead of using a light any other suitable device for indicating the sun, such as a sun-globe, could be used.

Having now described my invention, what I claim is—

1. In a tellurian the combination of a shaft, guides therefor, means intermediate the shaft and guides for causing the shaft to have one complete axial rotation for each predetermined step-by-step movement of translation around the guides, and a globe carried by the shaft, substantially as described.

2. In a tellurian the combination of a pair of guides having teeth, a shaft having a groove near each end to receive said teeth whereby the shaft can have axial rotation without advancing and step-by-step motion of translation, and a globe carried by the shaft, substantially as described.

3. In a tellurian the combination of a pair of guides spaced apart and having teeth, a shaft extending between said guides and having a pair of grooves and annular portions alined with said teeth whereby the shaft can have axial rotation against said teeth without advancing and movement of translation around the guides, and a globe carried by the shaft, substantially as described.

4. In a tellurian the combination of a pair of guides connected together one above the other and having teeth, a shaft extending between said guides and located at an angle to the plane thereof, said shaft having grooves and annular portions in line with the teeth of said guides, whereby the shaft can have axial rotation without advancing and step-by-step motion of translation, means for holding the shaft against said guides, and a globe carried by the shaft, substantially as described.

5. In a tellurian the combination of a pair of guides connected together, a standard for the lower guide, a standard on the upper guide, a shaft bearing against said guides, springs pivotally connected with said shaft and with said standards, means intermediate the shaft and guides for causing the shaft to have one complete axial rotation for each predetermined step-by-step movement of translation around the guides, and a globe carried by the shaft, substantially as described.

6. In a tellurian the combination of a pair of guides, a shaft to bear against the same, means for giving the shaft motion of translation around the guides during its axial rotation, a light-producing device, a reflector therefor, an arm connected with said shaft and pivotally supported independent of the reflector, and means connecting said arm with said reflector for causing the latter to travel around the light-producing device coincidently with the travel of the globe around the latter, substantially as described.

7. In a tellurian the combination of a pair of guides, a shaft to bear against the same, means for causing the shaft to have motion of translation around the guides during its axial rotation, a globe carried by the shaft,

a light-producing device, a pivotal arm connected with said shaft, a pulley connected with said arm, a crank-arm supporting said reflector, a pulley connected with said crank-arm, and a belt connecting said pulleys, whereby the reflector will be carried around the light-producing device coincidently with the travel of the globe around the latter, substantially as described.

8. The combination of a base, a standard, a guide carried thereby, supports rising from said standard, a guide carried by said supports, a shaft bearing against said guides, a standard carried by the last-mentioned guide, means for causing said shaft to have axial rotation without advancing and motion of translation around the guides, springs connecting said shafts with said standards, and a globe carried by said shaft, substantially as described.

9. In a tellurian the combination of guides, a shaft, a globe carried thereby between said guides, means for causing the shaft to have axial rotation without advancing and motion of translation around the guides, a globe 26 supported by said shaft, and means actuated by the axial rotation of said shaft for causing the globe 26 to travel around the first-mentioned globe, substantially as described.

10. In a tellurian the combination of guides, a shaft, a globe carried thereby, means for causing the shaft to have motion of translation around said guides, a globe 26 supported by said shaft to travel around the first-mentioned globe, and means connecting the globe 26 with said shaft for giving said globe 26 a step-by-step motion of translation around the first-mentioned globe during the axial rotations of said shaft, substantially as described.

11. In a tellurian the combination of guides having teeth, a shaft, a globe carried thereby, a groove in the shaft opposite each guide for causing the shaft to have motion of translation around said guides while permitting it to have axial rotation without advancing, a globe 26 carried by said shaft, gearing connected with globe 26, a toothed wheel connected with said gearing and adapted to mesh with a groove in said shaft whereby as the shaft rotates it will transmit step-by-step motion to globe 26 to cause the latter to travel around the first-mentioned globe, substantially as described.

12. In a tellurian the combination of a pair of guides, a shaft, a globe carried thereby, means to cause the latter to have motion of translation around said guides, a globe 26, means for supporting the same on said shaft, a shaft 31 supported by the first-mentioned shaft, gearing connecting shaft 31 with globe 26, and a toothed wheel connected with shaft 31 and adapted to mesh with a groove in the first-mentioned shaft, substantially as described.

13. In a tellurian the combination of a pair of guides, a shaft, a globe carried thereby, means for causing the latter to have motion of translation around said guides, a globe 26, a gear 29 mounted on said shaft and connected with globe 26, a shaft 31, a guide for the shaft 31 carried by the first-mentioned shaft, a gear connecting shaft 31 with globe 26, a toothed wheel connected with shaft 31, means for operating the same by the first-mentioned shaft, and a spring connecting said shafts, substantially as described.

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Witnesses:
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