

(No Model.)

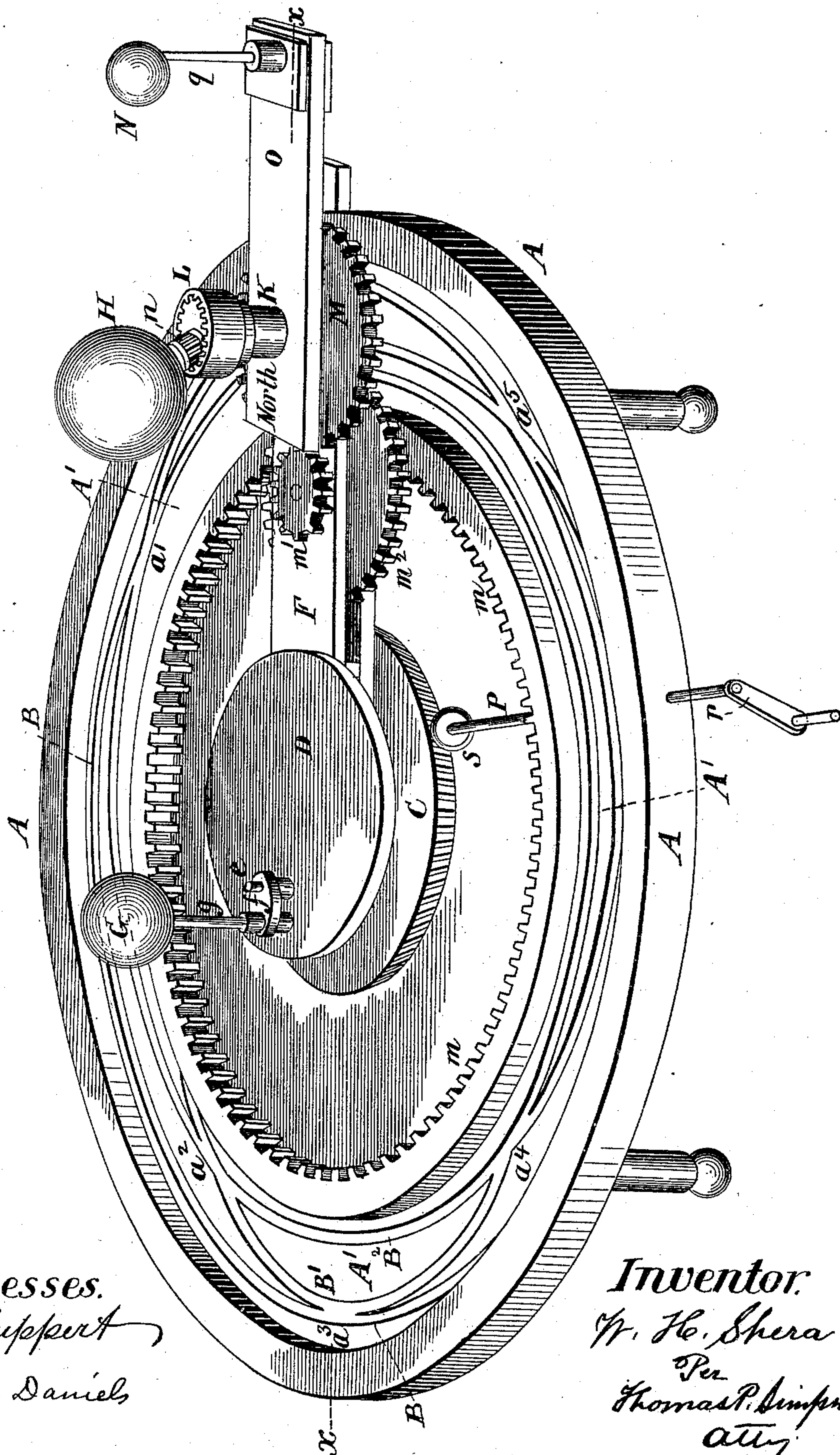
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No. 446,022.

Patented Feb. 10, 1891.

Fig. 1.



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Fig. 2.

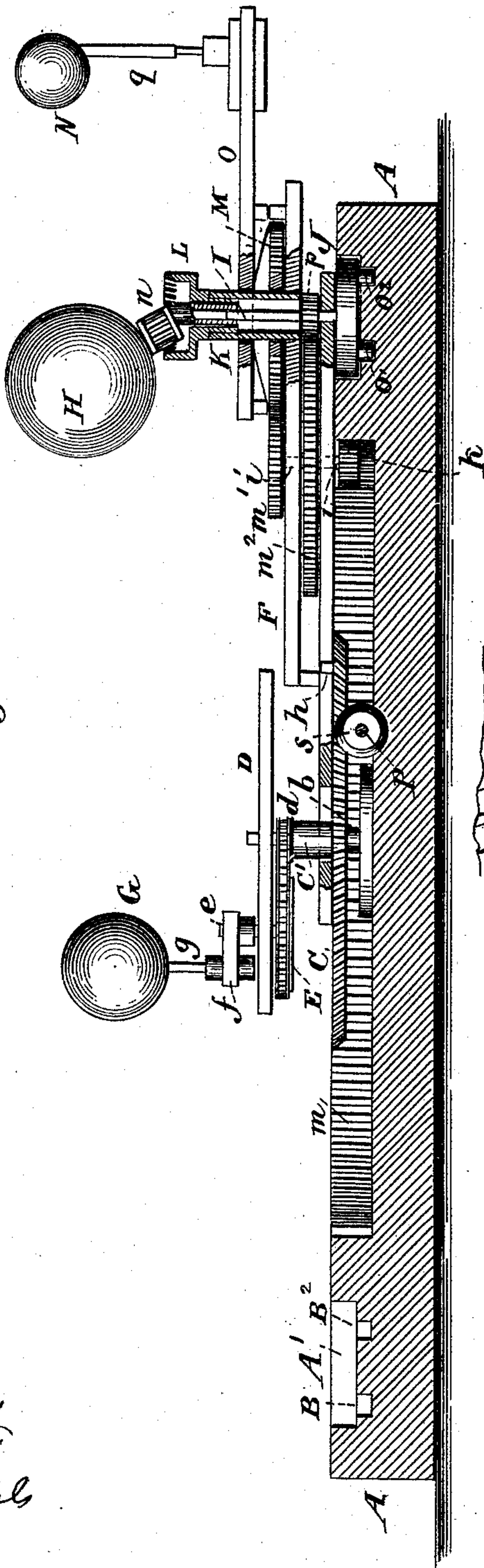
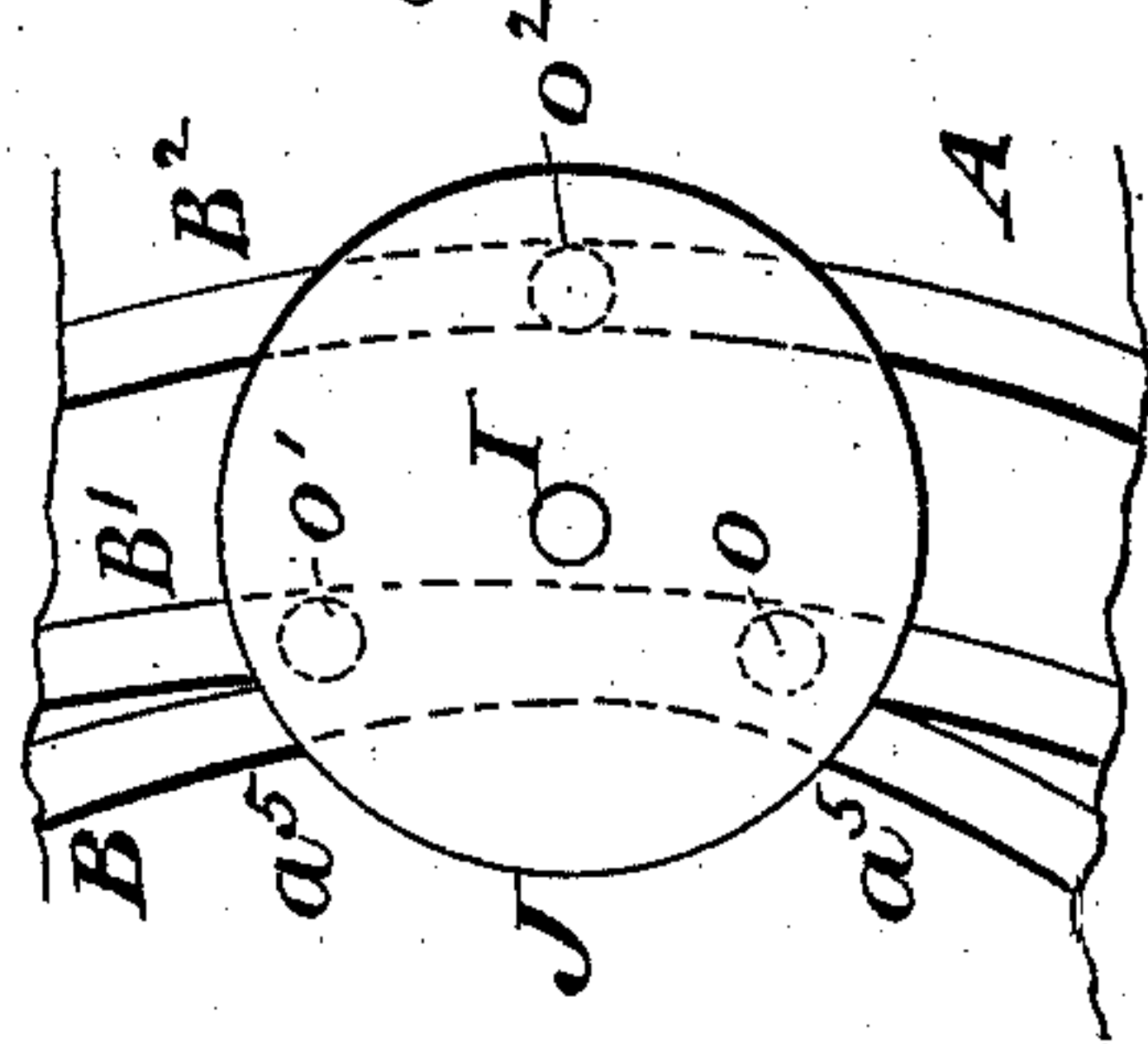


Fig. 3.



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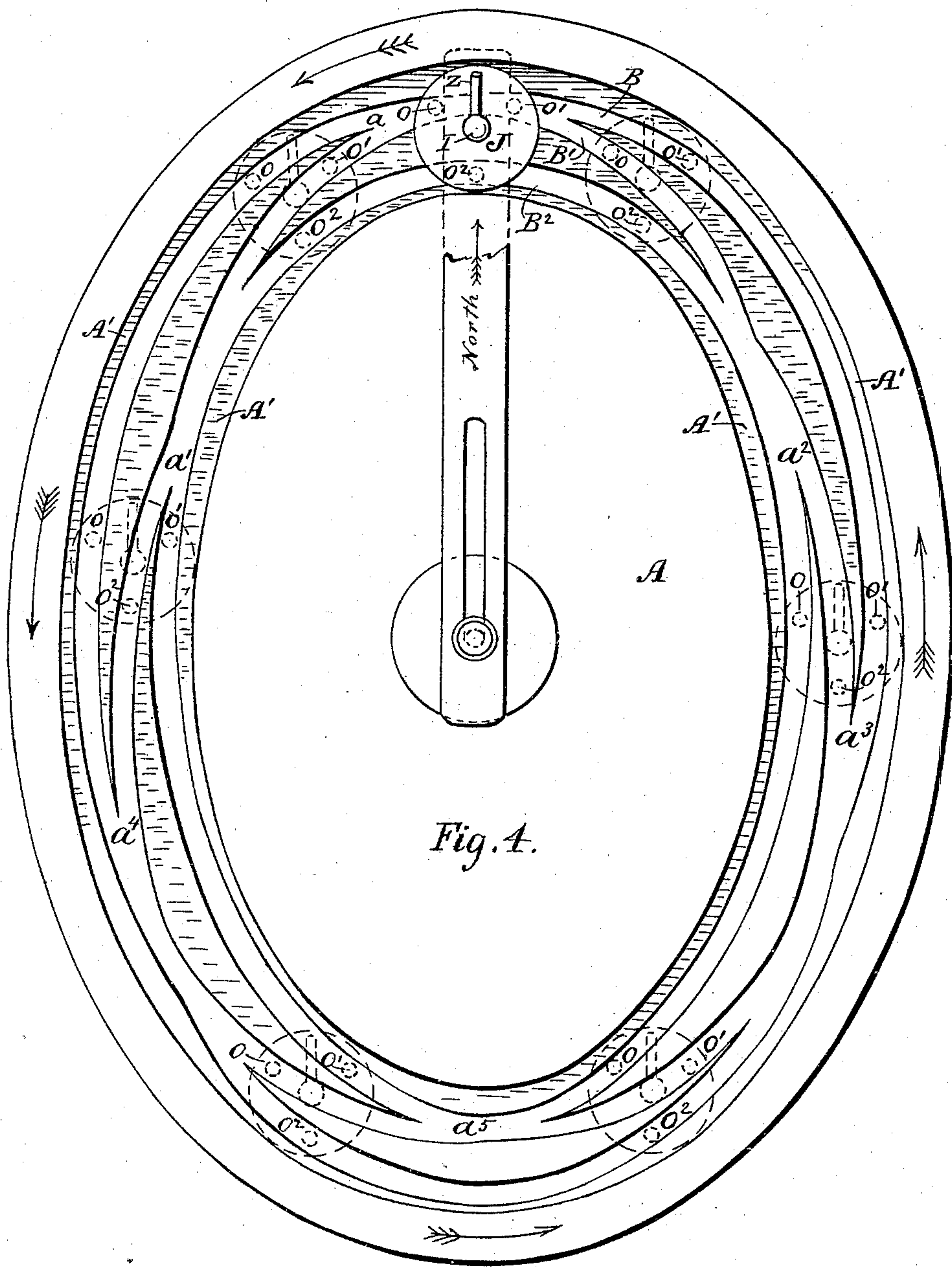
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UNITED STATES PATENT OFFICE.

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SPECIFICATION forming part of Letters Patent No. 446,022, dated February 10, 1891.

Application filed June 19, 1889. Serial No. 314,809. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. SHERA, a citizen of the United States, residing at College Corner, in the county of Butler and State of Ohio, have invented certain new and useful Improvements in Tellurians; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to astronomical apparatus; and it consists in certain improvements in the construction of such apparatus, as hereinafter described and claimed, the device, as herein described, being intended to show the movements of the sun and the earth and the moon.

In the accompanying drawings, Figure 1 is a perspective view of an apparatus embodying my invention. Fig. 2 is a vertical central section of the same taken on line xx of Fig. 1. Fig. 3 is a detail view. Fig. 4 represents a plan view of the grooved bed-plate.

A designates a bed which is provided with a sunken annular track A' , in which are made three endless grooves $B B' B^2$, the said track being elliptical in form and the said grooves extending along the same and intersecting one another at certain points, as seen at $a a' a^2 a^3$, &c.

On the bed A, at the center, is a fixed vertical shaft b , on which is loosely placed a gear-wheel C. To the said wheel C is fixed a tubular shaft C' , which extends upward, inclosing the shaft b , and to the upper end of said tubular shaft is secured a chain-wheel d .

D indicates a platform, which is fixed to the top of shaft b and carries a short rotative vertical shaft e , to the lower end of which is fixed a chain-wheel E, which is connected by a chain or belt with the wheel d . To the shaft e is fixed a short horizontal arm f , which carries a standard g , on which is placed a ball G, which is intended to represent the sun and moves on a small circle.

F indicates a frame, which is pivotally connected at its inner end with the central shaft and extends outward, as shown. This frame

carries certain devices and mechanism for illustrating the movements of the earth and moon, and said frame is moved about the central shaft by the rotation of the gear-wheel C, a pin h fixed on said wheel being in position to connect with said frame. A vertical shaft i , which is carried by the frame F, has a pinion k fast on its lower end, in position to engage with the teeth m of the bed A. Two gear-wheels m' and m^2 are fast on the said shaft i , for purposes as hereinafter stated.

I indicates a vertical shaft which carries a cage wheel or pinion n , which is in an inclined position, a ball H, representing the earth, being secured to said pinion and placed on an inclined rod z , extending from shaft I and representing the earth's axis.

A circular disk J is placed on the lower end of the shaft I, the said disk being in the sunken annular track A' , in which it moves during operation. The disk J is provided with three projections or pins $o o' o^2$ on its lower surface, which extend into and move in the grooves $B B' B^2$ during operation.

A hollow shaft K incloses the shaft I and has on its upper end a hollow beveled gear-wheel L, having inner teeth which engage the pinion n . On the lower end of the shaft K is a pinion p , which is in position to be engaged by the gear-wheel m^2 on the shaft i , whereby the shaft K may be rotated, and through wheel L engaging pinion n will produce the rotary movement of the ball H, thus showing the revolution of the earth on its axis.

M indicates a gear-wheel, which is loose on the shaft K and is in position to be engaged by the gear-wheel m' on the shaft i .

On wheel M is mounted a horizontal bar O, which extends outward and carries a stem or standard q , which carries a ball N, which represents the moon, the movement of the ball N around the ball H being produced by the rotation of the wheel M.

P indicates a shaft, provided with a crank r , and on said shaft is mounted a gear-wheel s , which is in position to engage the wheel C, by the rotation of which motion is imparted through chain-wheels E and d to the shaft which carries the arm f , which carries the standard of the ball G, the latter being thus moved on a small circle. As before stated,

the wheel C, by pin h , connects with the frame F, giving the latter a rotary movement. The gear-wheel k on the shaft i , engaging with the teeth m on the bed A, produces the rotation
 5 of gear-wheels m' and m^2 , both being on said shaft i . The wheel m^2 , engaging with wheel p on the lower end of the hollow shaft K, effects the rotation of the wheel L on the upper end of said shaft, and the wheel L, en-
 10 gaging the wheel n , produces the rotary movement of the ball H representing the earth.

The movement of the ball N, representing the moon, around the ball H is effected by the wheel m' engaging wheel M, on which is
 15 mounted the bar O, which carries the standard to which the ball N is secured.

The ball H representing the earth is held in position with its axis inclined to the north, and is kept in such position during its move-
 20 ment around the sun by the action of the disk J. As the frame F is moved around by the wheel C, the disk J is moved along in the endless track A', the pins extending and moving in the grooves B B' B².

25 In Fig. 4 the disk J is shown at the northern point of the elliptical track, the rod z on shaft I, representing the earth's axis, being shown inclined to the north. The position of said disk is shown in dotted lines at different
 30 points on the track, the position of the axis z being indicated and also the pins $o o' o^2$ in the grooves. As will be seen, when the disk J has been moved in the direction of the arrows about half-way from the northern to the south-
 35 ern point, the pin o' , which was in the outermost groove, has passed to the innermost groove, and the southern pin o^2 , which was in the innermost groove, passes to the outermost groove, in which it continues to move on
 40 through the southern point. When the disk has passed the southern point and has moved about half-way from thence to the northern point, the pin o' has passed to the outermost and the pin o^2 passes to the innermost groove,
 45 and the disk moves onto the northern point, with said pins in the same relative position.

At all times during the movement of the disk around the track the rod z , representing the earth's axis, is held in the same position, in-
 50 clining to the north, as shown in Fig. 4.

I claim—

1. The combination, with a bed-plate provided with teeth m , a sunken track A', and a series of endless grooves which are not paral-
 55 lel, of a central fixed shaft, a wheel C, provided with projection h , a frame F, connected with said central shaft, and the following mechanism which is carried by said frame: a vertical
 shaft i , with gear-wheels m^2 and k , a hollow shaft K, with gears L and p , a shaft within
 60 shaft K, with a gear-wheel n , carried in an inclined position at its upper end, and a circular disk J, secured to its lower end, said disk being provided with projections $o o' o^2$, sub-
 65 stantially as described, for the purposes set forth.

2. The combination, with a bed-plate provided with a series of endless grooves which are not parallel but made to cross one another
 70 at different points, of a disk carrying a globe and provided with projections which extend into said endless grooves, and mechanism to impart to said disk a movement along the
 said grooves, substantially as and for the purposes described. 75

3. The combination, with the bed-plate A, provided with an endless track A' and end-
 80 less grooves B B' B², of a disk J, with projections $o o' o^2$, sliding in said grooves, said disk being provided with a vertical shaft, which carries a gear-wheel n in an inclined position,
 a hollow shaft K, which incloses said vertical shaft, said shaft K being provided with a
 85 wheel L, which is in position to engage with the gear-wheel n , substantially as and for the purposes described.

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

WILLIAM H. SHERA.

Witnesses:

GEORGE WEIDNER,
 WM. H. H. PIERSON.