

J. C. MOORE.
 ASTRONOMICAL APPARATUS.
 APPLICATION FILED APR. 30, 1908.

938,162.

Patented Oct. 26, 1909.

2 SHEETS—SHEET 1.

Fig-1-

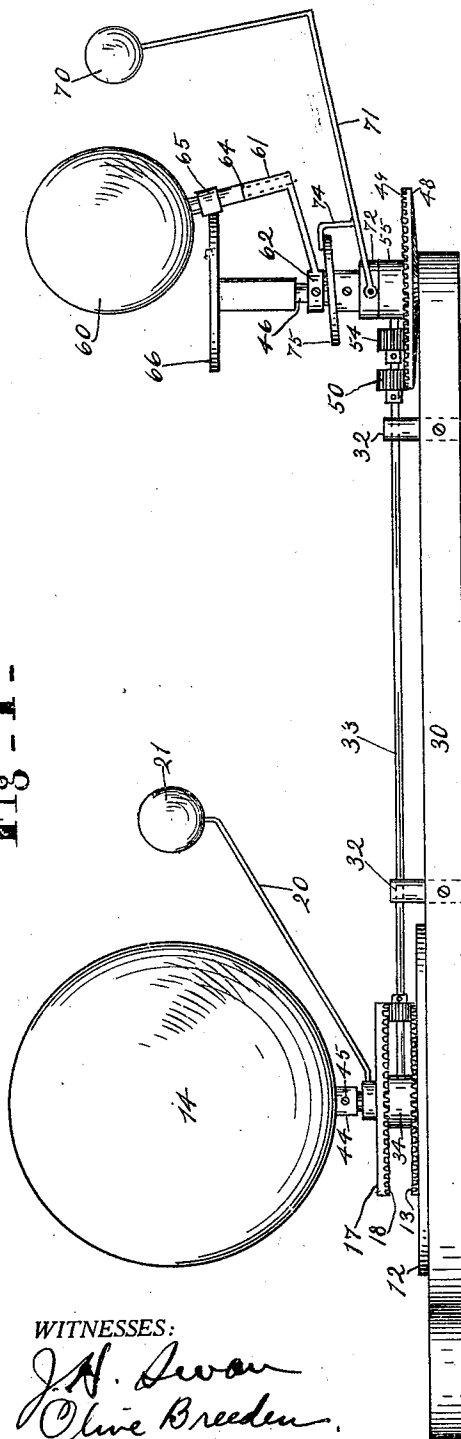
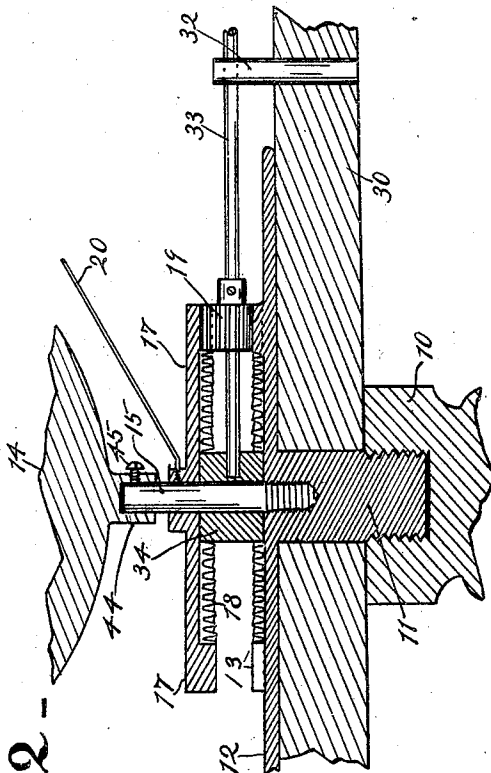


Fig-2-



WITNESSES:

J. H. Swan
 Olive Breedon.

INVENTOR.

Jesse C Moore.

BY

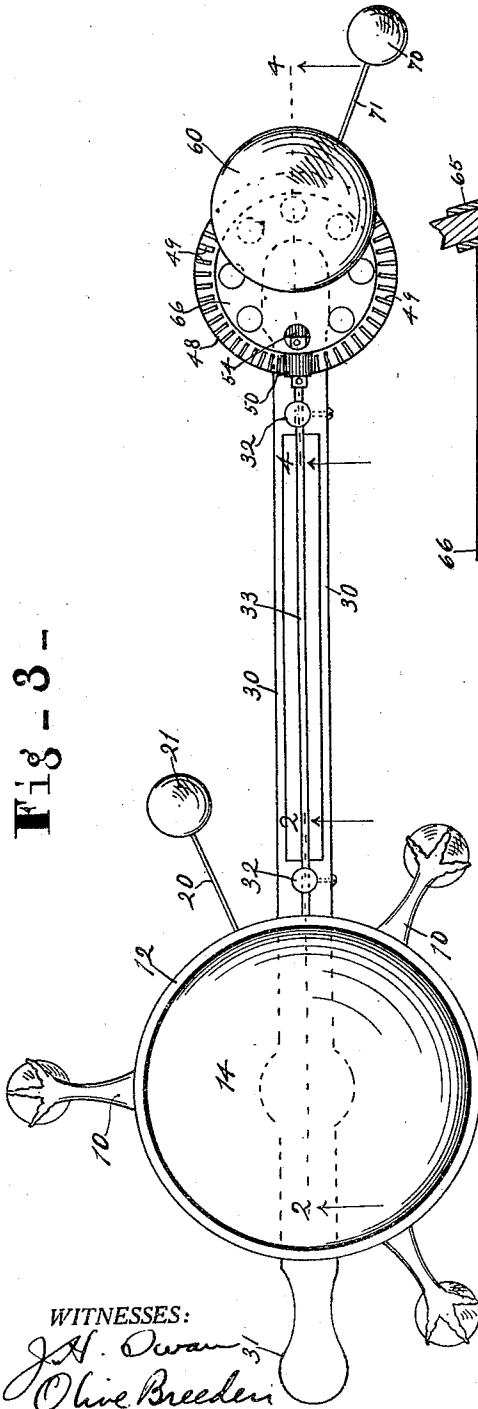
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 2 SHEETS—SHEET 2.

938,162.

Fig-3-



WITNESSES:
J. H. Owan
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Fig-4-

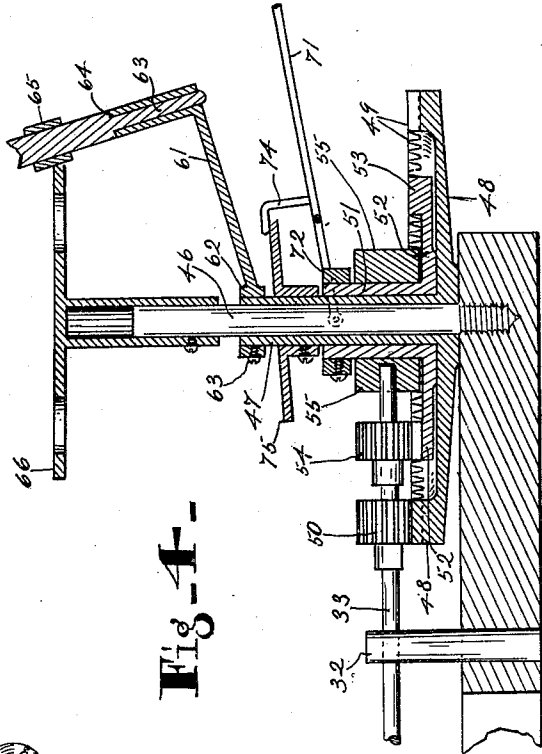
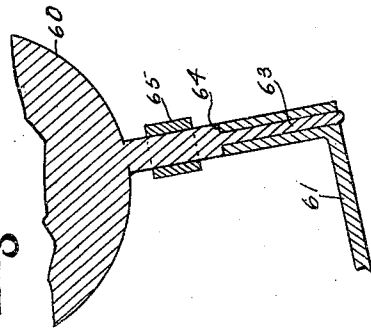


Fig-5-



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UNITED STATES PATENT OFFICE.

JESSE C. MOORE, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO COLUMBIA SCHOOL SUPPLY COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA.

ASTRONOMICAL APPARATUS.

938,162.

Specification of Letters Patent.

Patented Oct. 26, 1909.

Application filed April 30, 1908. Serial No. 430,048.

To all whom it may concern:

Be it known that I, JESSE C. MOORE, of Indianapolis, county of Marion, and State of Indiana, have invented a certain new and useful Astronomical Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

The object of this invention is to provide an astronomical apparatus for school use to illustrate the relative movements of the earth and other heavenly bodies. It includes the features of a tellurium, planetarium and lunarium, although some of the movements of the astronomical bodies in this device are not provided for by it, such, for instance, as the ellipticity of the earth's orbit around the sun, the orbit of the earth in the device herein shown being circular for the sake of simplicity.

The chief feature of this invention consists in the simplicity of the structure and the means insuring the positiveness of action of the various parts so that it will be a practical device for school use. The parts are strong and driven by gearing, as a rule, and the device is a very simple one for making the many demonstrations for which it is qualified.

This device moves the earth around the sun in a circular orbit and said movement simultaneously causes the diurnal movement of the earth, the annular changes of position of the earth with reference to the sun, the changes of the position of the moon with reference to the earth and sun, and also the changes of position of one of the other planets with reference to the sun and earth. It may be added that the proportional movements of the various parts of the device are arbitrary in order to render the device practical.

The full nature of this invention will be understood from the accompanying drawings and the following description and claims.

In the drawings Figure 1 is a side elevation of the device. Fig. 2 is a central vertical section through the mounting of the sun, parts being broken away. Fig. 3 is a plan view of the device. Fig. 4 is a simple vertical section through the means for the mounting of the earth and moon. Fig. 5

is a central section, substantially vertical, through the means for mounting the earth on the arm that carries it.

The stand 10 has a vertical bearing 11 centrally secured in it on which the stationary disk 12 is secured, said disk having an annular rack 13 on its upper side. The sun 14 is mounted on the bolt 15 that screws into the stationary bearing 11 to which the sun is removably secured. A rotary disk 17 is mounted on the bolt 15 with a downwardly extending rack 18 over the rack 13 so that the pinion 19 will mesh with both racks, as seen in Fig. 2. To the disk 17 a rod 20 is secured that carries on its outer end a planet 21 which may represent Mars. This planet 21 is revoluble around the sun 14 by the revolution of the disk 17. A horizontal bar 30 is mounted on the stand 10 below the disk 12 and revolves about the bearing 11. It has a handle 31 whereby it may be revolved. Two posts 32 extend upwardly from said bar 30 and in them a shaft 33 is mounted on which the pinion 19 is secured. The end of said shaft has also a bearing in a collar or spacer 34 surrounding the bolt 15.

On the outer end of the bar 30, as shown in Fig. 4, the stationary bolt 46 is secured. About the lower portion of this bolt a sleeve 47 is mounted that has a disk 48 at its lower end which rests upon the bar 30. Said disk has an annular rack 49 on its upper side which is engaged by the pinion 50 secured on the shaft 33. Another sleeve 51 surrounds the lower part of the sleeve 47 and on the lower end of the sleeve 51 there is another disk 52 that rests upon the lower disk 48. The disk 52 has an annular rack 53 on its upper side that is engaged and driven by the pinion 54 that is also secured to the shaft 33. There is a loose collar 55 resting upon the disk 52 and surrounding the sleeve 51 and in which the end of the shaft 33 has bearing.

The earth 60 is mounted on the rectangular arm 61 that extends rigidly from the collar 62, which is held by a set-screw 63 on the upper end of the sleeve 47. Therefore, the arm 61 with the earth on it revolves about the bolt 46 by the power transmitted to the disk 48 through the pinion 50 and shaft 33. The earth is mounted rotatably on the upper part of the arm 61, that is, there is an upwardly extending tube form-

ing a part of said arm 61 in which a pin 63 loosely projects with a shoulder 64 thereon that is surrounded by rubber or like material 65 which frictionally engages the horizontal disk or wheel 66 secured on the upper end of the bolt 46. The arm 61 is so shaped that it supports the ball 60, which represents the earth, with its axis inclined at an angle of 23 degrees to a horizontal line or to the wheel 66. The frictional engagement of the rubber 65 on the wheel 66 causes the rotation of the ball 60 to represent the diurnal rotation of the earth.

A ball 70 representing the moon is mounted on a rectangular rod 71 with its inner end yoked and pivoted to each side of a collar 72 which is secured on the upper end of the sleeve 51. The moon is held in the right relation to the earth by a spur 74 extending upward from the rod 71 and riding upon the disk 75 that is secured to the sleeve 47. This disk 75 is almost horizontal but not quite so, being tilted at a slight angle to a horizontal plane. Therefore, as the moon revolves around the earth, its vertical position in this device gradually changes by reason of the inclined disk on which the spur 74 rides.

The mode of operation is as follows: With the operator's hand on the handle 31 of the bar 30, said bar is slowly revolved and as it revolves the pinion 19 is rotated by reason of its engagement with the stationary rack 13, and, therefore, the disk 17 is revolved and thus the planet 21 caused to revolve about the sun. The rotation of the pinion 19 actuates the shaft 33 and it simultaneously revolves the disks 48 and 52. The rotation of the disk 48 causes the earth to revolve about a vertical axis through the bolt 46 and by reason of the engagement of the rubber 65 on the part 64 from the earth 60 with the stationary disk 66 the diurnal rotation of the earth is caused at the same time. The rotation of the disk 52 causes the revolution of the moon about the earth and the relation of the moon to the earth is regulated and modified by the inclined disk 75 on which the spur 74 rides. The relative movements of these various parts are predetermined by the relative sizes of the gears.

What I claim as my invention and desire to secure by Letters Patent is:

1. An astronomical apparatus for schools including a stand, a sun mounted thereon, a horizontal bar mounted on said stand so as to be revoluble horizontally, a stationary annular rack, a revoluble disk with an annular rack registering with and opposite said stationary rack, a planet mounted in connection with said disk, a shaft mounted on said revoluble arm with a pinion secured thereto meshing with both of said racks, an earth revolubly mounted on the outer end of said bar, and means actuated by said shaft for causing the revolution of the earth to

illustrate the change of seasons simultaneously with the revolution of the earth about the sun.

2. An astronomical apparatus for schools including a stand, a sun mounted thereon, a horizontal bar mounted on said stand so as to revolve horizontally, a stationary annular rack mounted in connection with said stand, a shaft mounted on said bar with a pinion thereon engaging with said rack, a vertical bearing bolt secured in the outer end of said bar, a horizontal disk revolubly mounted thereon with an annular rack with a central upwardly extending sleeve, a pinion on said shaft for engaging said rack, an arm secured to said sleeve with its outer end extending upwardly at an angle of about 23 degrees to a vertical line, a portion rotatably mounted on the upwardly extending part of said arm, an earth secured on said rotatable portion of said arm, and a stationary disk mounted on said bearing bolt that frictionally engages a rotatable portion connected with the earth for rotating it as the earth revolves.

3. An astronomical apparatus for schools including a stand, a sun mounted thereon, a horizontal bar mounted on said stand so as to revolve horizontally, a stationary annular rack mounted in connection with said stand, a shaft mounted on said bar with a pinion thereon engaging with said rack, a vertical bearing bolt secured in the outer end of said bar, a horizontal disk revolubly mounted thereon with an annular rack with a central upwardly extending sleeve, a pinion on said shaft for engaging said rack, an arm secured to said sleeve with its outer end extending upwardly at an angle of about 23 degrees to a vertical line, a second disk revolubly mounted on the sleeve of the first named disk and with an annular rack and central upwardly extending sleeve, a pinion on said shaft for revolving said last mentioned disk, a rod extending from said last mentioned sleeve and revoluble thereby and a moon mounted on said rod.

4. An astronomical apparatus for schools including a stand, a sun mounted thereon, a horizontal bar mounted on said stand so as to revolve horizontally, a stationary annular rack mounted in connection with said stand, a shaft mounted on said bar with a pinion thereon engaging with said rack, a vertical bearing bolt secured in the outer end of said bar, a horizontal disk revolubly mounted thereon with an annular rack with a central upwardly extending sleeve, a pinion on said shaft for engaging said rack, an arm secured to said sleeve with its outer end extending upwardly at an angle of about 23 degrees to a vertical line, a second disk revolubly mounted on the sleeve of the first named disk and with an annular rack and central upwardly extending sleeve, a pinion

on said shaft for revolving said last mentioned disk, a rod pivoted to said last mentioned sleeve, a moon mounted on the outer end of said rod, a disk secured to said first mentioned sleeve and inclined at a slight angle to a horizontal plane, and a spur extending from said rod and riding upon said disk.

In witness whereof, I have hereunto affixed my signature in the presence of the witnesses herein named. 10

JESSE C. MOORE.

Witnesses:

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OLIVE BREEDEN.