(No Model.)

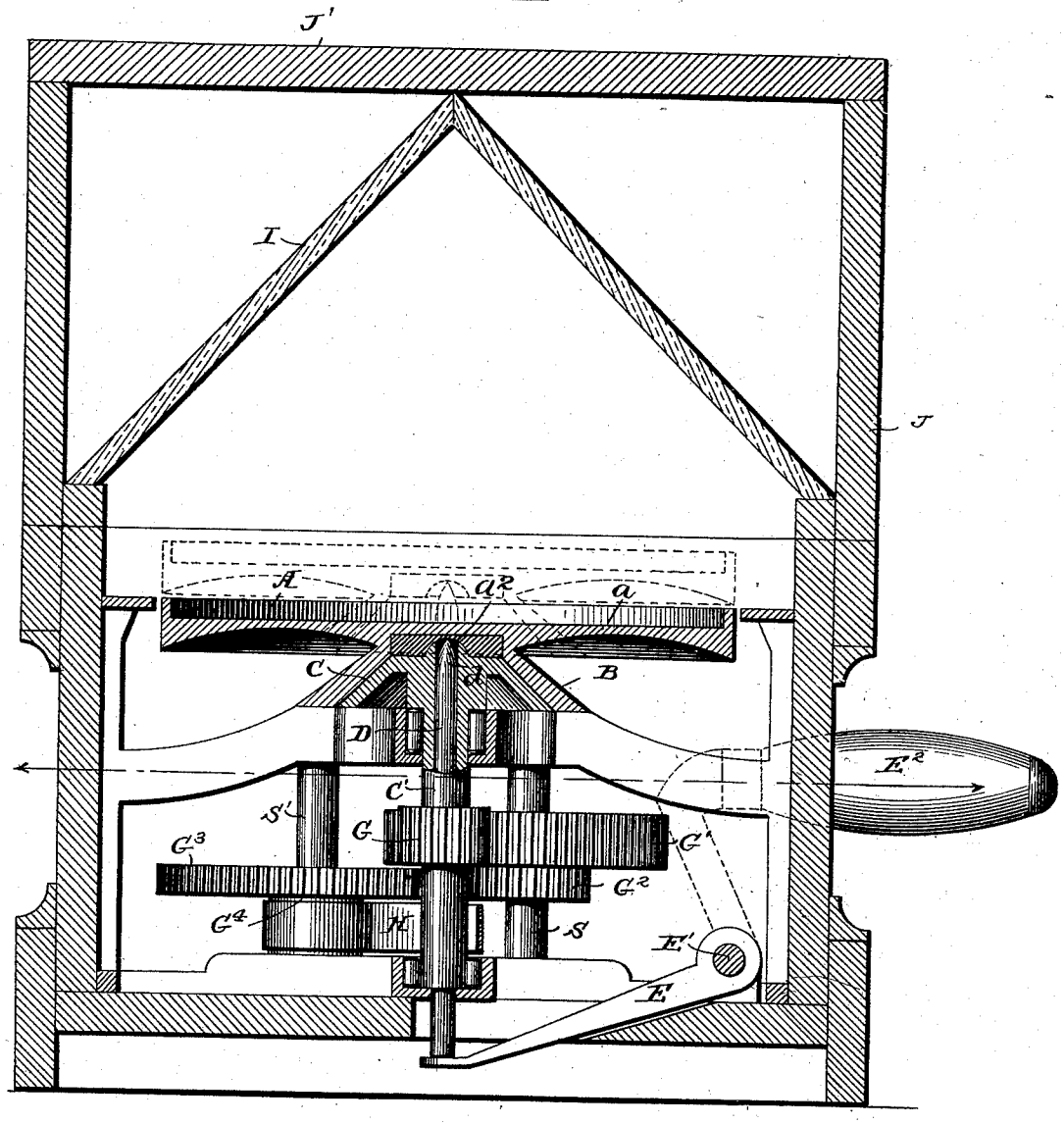
2 Sheets—Sheet 1.

J. N. ROWE.

GYROSCOPE ARTIFICIAL HORIZON.

No. 505,575. Patented Sept. 26, 1893.

Fig. 1.



Witnesses
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(No Model.) 2 Sheets—Sheet 2.

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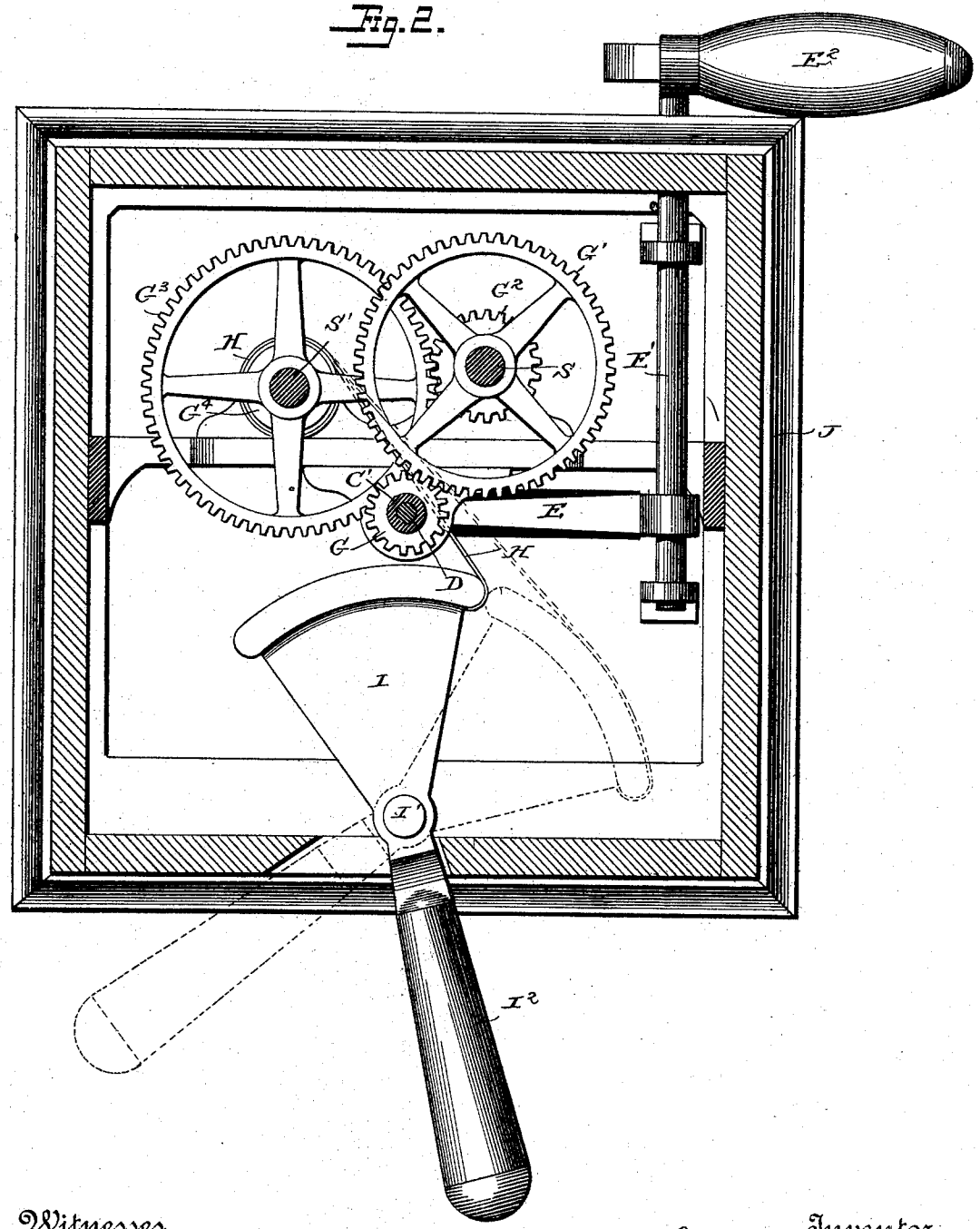
Fig. 2.



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UNITED STATES PATENT OFFICE.

JOSHUA NICKERSON ROWE, OF SEATTLE, WASHINGTON, ASSIGNOR OF ONE-HALF TO CHARLES E. CRANE, OF SAME PLACE.

GYROSCOPE ARTIFICIAL HORIZON.

SPECIFICATION forming part of Letters Patent No. 505,575, dated September 26, 1893.

Application filed October 17, 1892. Serial No. 449,147. (No model.)

To all whom it may concern:

Be it known that I, JOSHUA NICKERSON ROWE, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Gyroscope Artificial Horizons, of which the following is a specification.

My invention relates to artificial horizons, and it has for its object to provide means whereby an artificial horizon can be produced and maintained which shall preserve its horizontal relations, regardless of the position in which it is used, so that even when used on ships and other places where the base is liable to be moved at various inclinations, the artificial horizon will still maintain its proper position for observation.

In carrying out my invention I make use of the gyroscopic principle, and apply it to the horizon, so that the instrument may be termed the gyroscopic artificial horizon, and it embodies the features of construction and arrangement having the mode of operation, substantially as hereinafter more particularly pointed out.

Referring to the accompanying drawings, Figure 1, is a vertical section showing an embodiment of my invention. Fig. 2, is a horizontal transverse section showing one means of operating the device.

It is well known that in taking astronomical, nautical, or other observations, it is often desirable and necessary to make use of what is termed an artificial horizon, and heretofore it has been common to use a pan or dish of mercury, the surface of which forms the artificial horizon, and while this is effective in many instances, especially where it can be placed on a solid foundation so as not to be subject to jars, jolts, or other disturbances, in many places it is impracticable to use the device with accuracy, and especially on shipboard or other moving bodies, which would produce a jar and cause a disturbance of the surface, or cause an inclination of the plane of the surface.

It is with the view of providing a device which can be used under all conditions, and especially on shipboard, that my improved gyroscopic artificial horizon is made.

In carrying out my invention I make use of a reflector A, which is preferably in the form of a circular plate having a reflecting upper surface, and this surface may be of glass, metal or other material, which will preserve a uniform, plane reflecting surface under all conditions. This reflector is arranged and mounted so that a rapid rotary motion may be imparted to it by suitable mechanism, and then it can be so supported that when the driving mechanism is detached from the plate, the plate will continue to rotate, and maintain its proper horizontal plane, regardless of the position or inclination of the supporting device, depending upon the well known gyroscopic principle. Thus in the drawings I have shown the plate A carrying the reflecting surface *a*, as being provided with a cone B, on its under side, and arrange to normally rest upon and fit the exterior surface of the male cone C, so that when the parts are in position, the disk will be rotated by friction, and while this is the preferred construction, it is evident that other means of connecting the parts may be substituted, it being only necessary to provide means which shall be capable of imparting a rapid rotary motion to the disk, and to be easily separated therefrom, so that the disk can continue its rotation in the proper plane.

In order to furnish a support for the disk, I have shown a spindle D, preferably of hardened metal, passing through the hollow shaft C′ of the male cone, and having a pointed end *d* and this is arranged to fit in on the under side of the disk, which is preferably hollow or recessed as at a^2, the curve of the recess being larger than the curve point of the spindle, so as to permit the spindle to be inclined with relation to the disk without affecting the plane of rotation of the latter. This spindle is provided with some suitable means whereby it may be raised and lowered at the proper time, and I have shown a convenient device in the form of a lever E, pivoted in the frame as at E′, and having a handle E^2.

Some suitable mechanism must be provided by which a rapid rotary motion may be imparted to the disk through the medium of the cones or connecting devices, and while various mechanisms may be used, I have

shown what I have found to be an exceedingly simple and practical device. Thus the shaft C′ of the male cone is provided with a pinion G, and meshing with this pinion is a gear wheel G′, mounted on a suitable stud or bearing S, and connected with the gear wheel G′, is a pinion G^2, and this in turn meshes with the large gear wheel G^3, mounted on a suitable stud or bearing S′. Connected to this gear wheel G^3, is a roller G^4, and to this roller is attached one end of a strap or chain H, the other end of which is shown as attached to the forward end of the lever I, which is pivoted at I′ on the frame, and is provided with a handle I^2. The inner end of this lever is preferably of segmental shape as shown, although of course it is not necessary to so construct it. It will be seen that when the handle I^2 is moved to the position shown in dotted lines, the strap H, will cause the wheel G^4, to be rotated, and this through the multiplying gear will transmit a rapid rotary motion to the male cone C, and this through its friction with the female cone, will cause the disk to rotate at a high rate of speed, and in order that the parts may operate easily, I preferably mount the gears on their shafts with interposed ball or other frictional bearings. As soon the disk attains the proper speed, by varying the handle E^2, the disk is operated by the spindle D, and is supported on its end, and continues to rotate and operate as a gyroscope to maintain its horizontal plane, regardless of the inclination of the frame and its operating mechanism, and the proper observations can readily be made.

The whole device can be mounted on a suitable frame J, which may be made of any suitable material, form or shape, and I provide an inclined roof I, preferably of transparent material, which shall protect the disk or reflector from wind, dust and other elements, and permit its ready and convenient use, and the top J′ may be removable by being hinged or otherwise formed. It will thus be seen that I am enabled to provide a substantial gyroscopic artificial horizon which may be used on vessels or other moving bodies, and which will maintain a proper horizontal position, regardless of the movements of the ship, and the whole is simple, and cheap of construction, and effective in operation.

While I have described and illustrated what I consider to be the best embodiment of my invention, it will be understood that I do not limit myself to the precise features of construction and arrangement shown, as it is evident that the details could be varied by those skilled in the art, without departing from the spirit of the invention.

What I claim is—

1. An artificial horizon comprising a gyroscopic reflector, means for imparting rotation thereto, and means for supporting it in its rotating position, substantially as described.

2. A gyroscopic artificial horizon, comprising a reflecting disk, mechanism for imparting rotation to the disk, a support centrally arranged with relation to the rotating mechanism, but independent thereof, and means for raising the central support and disk, so that the latter may continue its rotation while supported substantially as described.

3. A gyroscopic artificial horizon comprising a reflecting disk, a driving mechanism, frictional connection between the disk and driving mechanism, a support centrally arranged with relation to the driving mechanism and independent thereof, and adapted to raise the reflecting disk from the frictional contact with the concentric driving mechanism and support the disk in its rotating position, substantially as described.

4. A gyroscopic artificial horizon comprising a reflecting disk, having a cone projecting from its under side, a driving mechanism, a cone connected to said mechanism, and adapted to engage the cone on the disk, and means for separating the cones, substantially as described.

5. A gyroscopic artificial horizon comprising a reflecting disk, a driving mechanism, cones connecting the disk and driving mechanism, and a spindle for elevating the disk mounted in the hollow shaft of the driving mechanism, substantially as described.

6. The combination with the rotating reflecting disk, of a multiplying gear and means for driving the same, connections between the gear and the disk whereby the latter is rotated, and a spindle adapted to engage the under side of the disk and disconnect it from the driving gear, substantially as described.

7. The combination with the reflecting disk having a cone on its under surface and a central recess, of a multiplying gear connected to a male cone, a spindle passing through the shaft of the male cone, and having a pointed end, and means for raising the spindle to elevate the disk, substantially as described.

8. The combination with the gyroscopic reflecting disk, of means for rotating the disk, a supporting device for the rotating disk, and an inclined roof above the disk, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSHUA NICKERSON ROWE.

Witnesses:

JAMES BROWNIE,

G. W. CHAPMAN.