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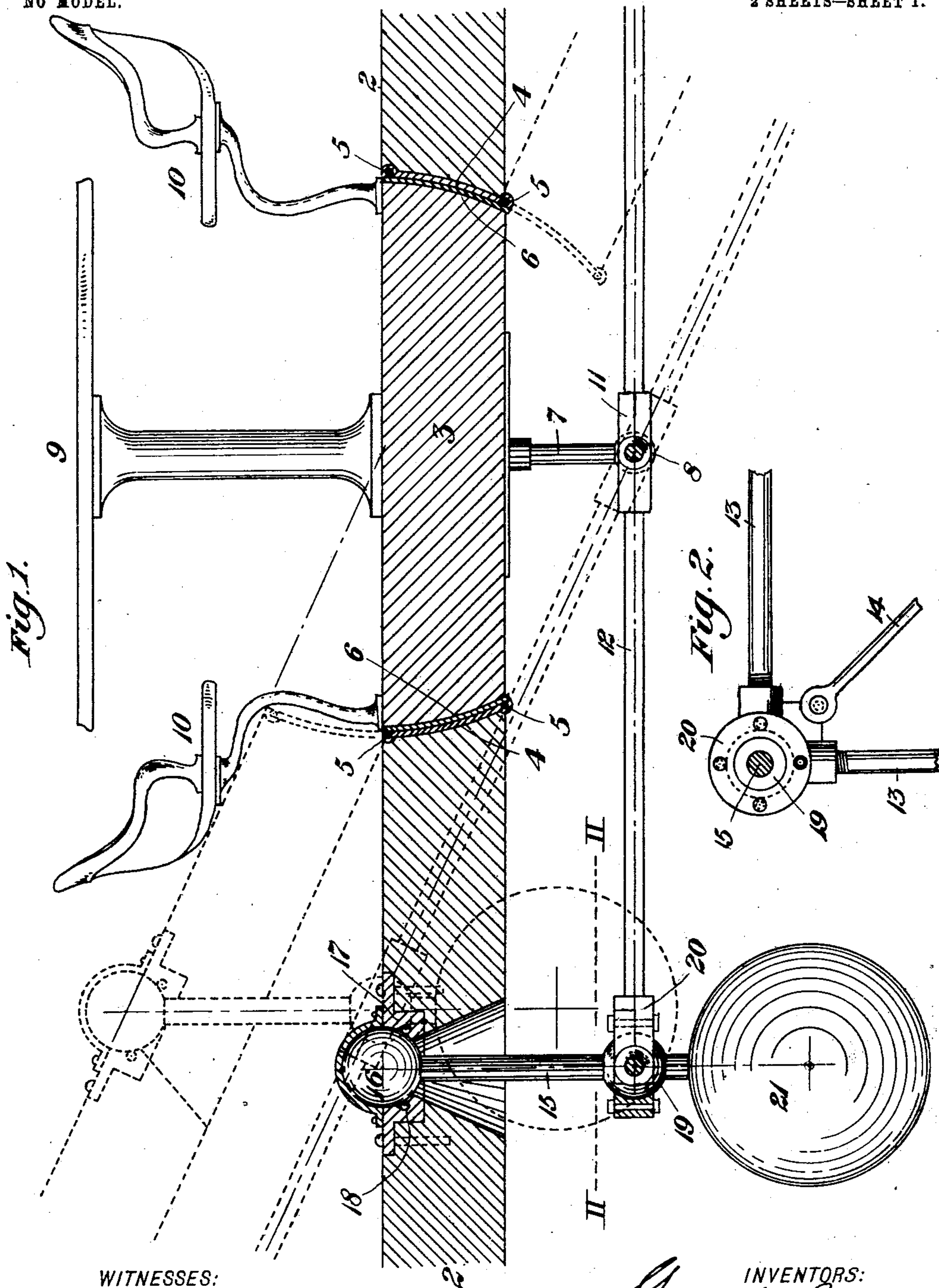
PATENTED JAN. 26, 1904.

G. W. & R. W. BOSTWICK.
SELF LEVELING FURNITURE.

APPLICATION FILED APR. 24, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

E. I. MacKenzie
Chas. S. Pepley.

INVENTORS:

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Gauss W. Postwick
Robert W. Postwick
by C. M. Clarke
their ATTORNEY

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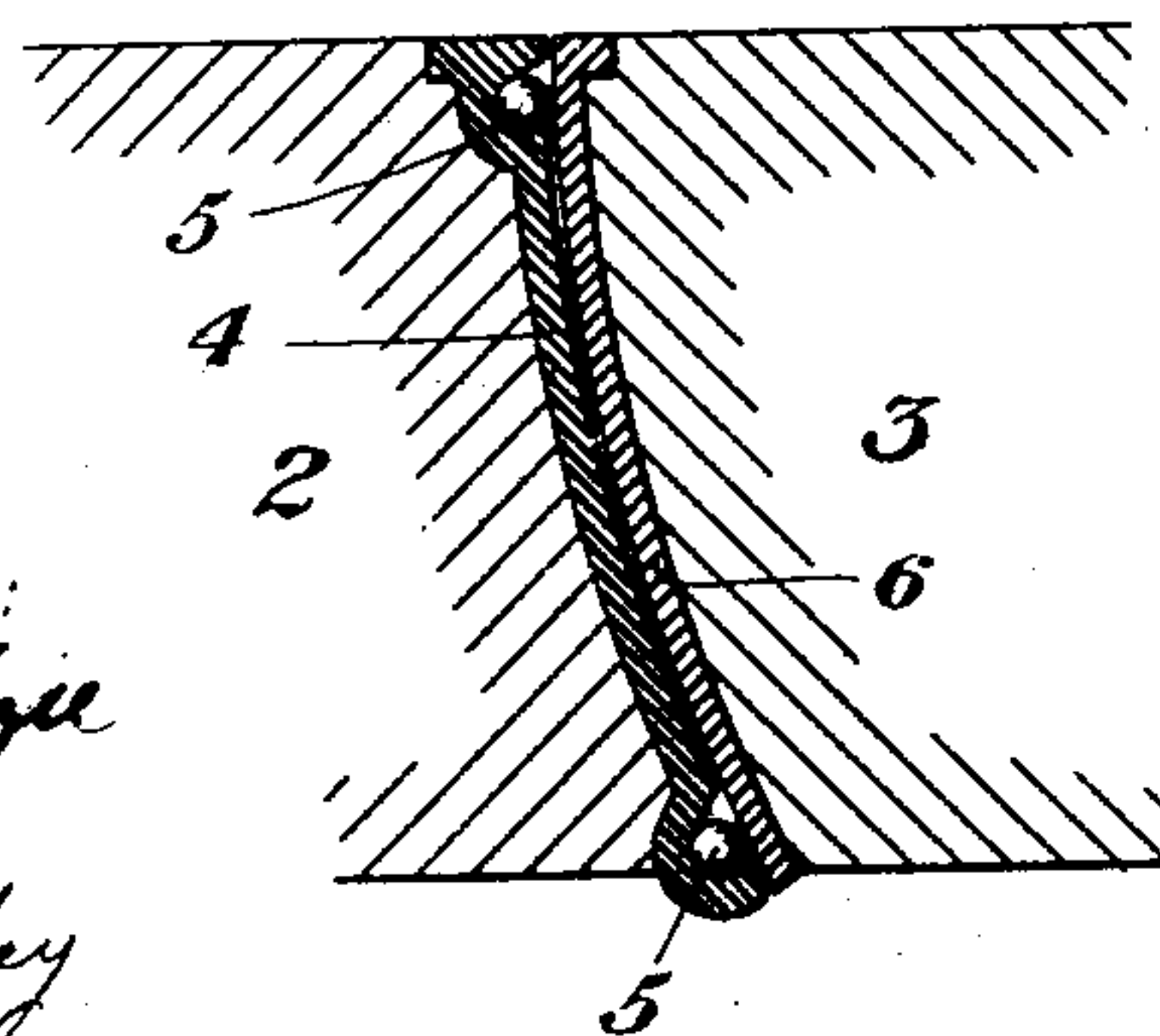
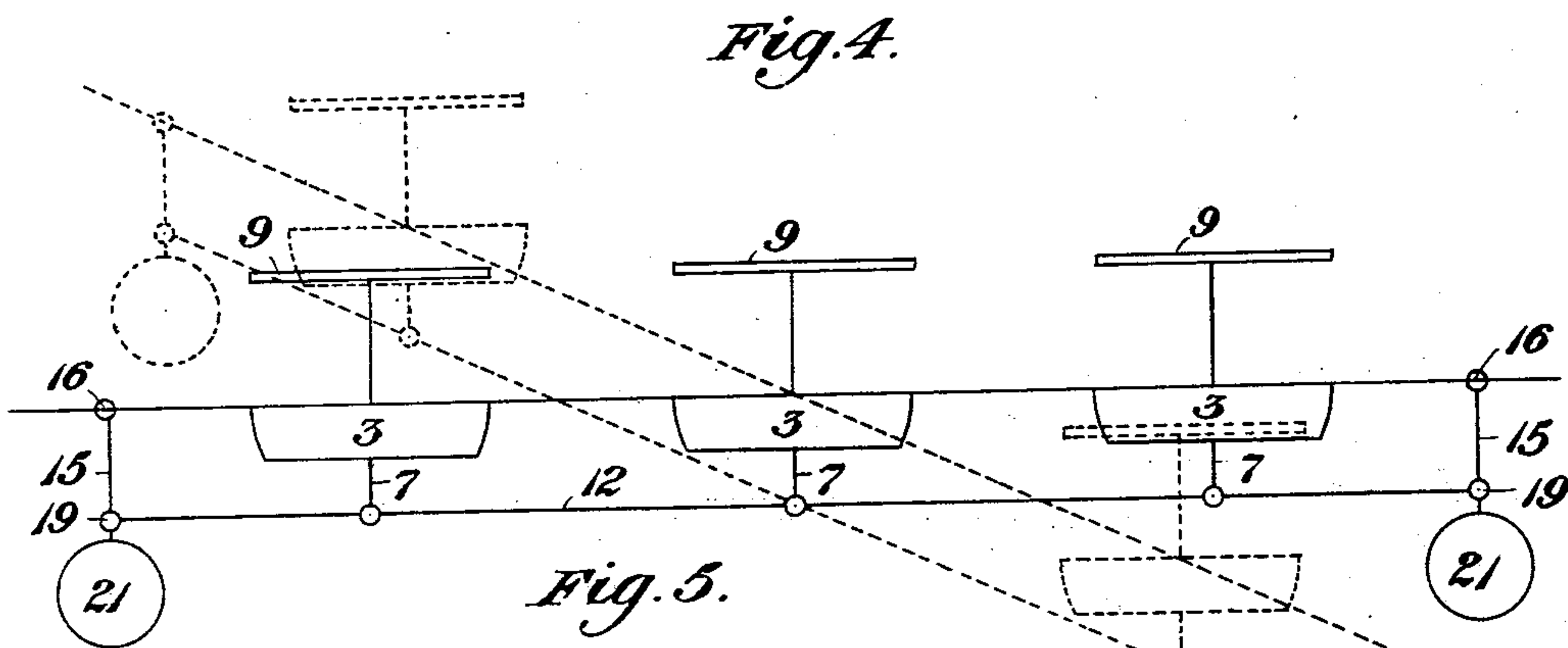
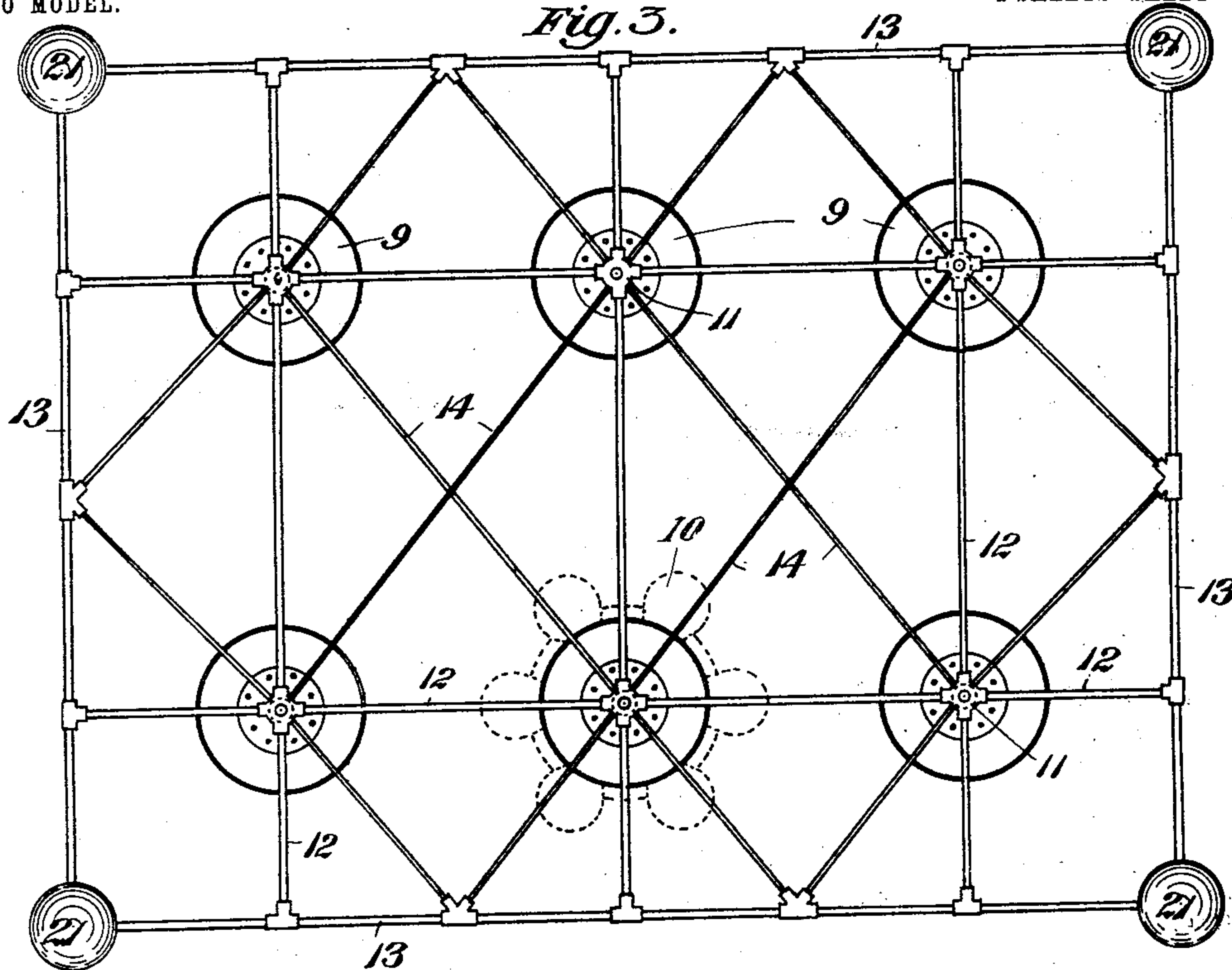
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2 SHEETS—SHEET 2.



WITNESSES:
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UNITED STATES PATENT OFFICE.

GRANT W. BOSTWICK AND ROBERT W. BOSTWICK, OF PITTSBURG,
PENNSYLVANIA.

SELF-LEVELING FURNITURE.

SPECIFICATION forming part of Letters Patent No. 750,578, dated January 26, 1904.

Application filed April 24, 1903. Serial No. 154,112. (No model.)

To all whom it may concern:

Be it known that we, GRANT W. BOSTWICK and ROBERT W. BOSTWICK, citizens of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Self-Leveling Furniture, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view in sectional elevation of our improved self-leveling table and chair-support with a portion of the connected counterweight-controlling framework. Fig. 2 is a detail sectional view of a portion of the frame and the universal joint indicated by the line II II of Fig. 1. Fig. 3 is an under plan view of the controlling-frame and its connected counterweights, showing the arrangement of a series of gravity-controlled tables. Fig. 4 is a diagrammatic vertical section indicating in dotted lines the varying positions of the tables and of the gravity-actuated controlling means. Fig. 5 is a sectional detail view of the ball-bearings interposed between the deck and the table and chair-supporting platform.

Our invention relates to improvements in self-leveling furniture and other apparatus or devices, with particular reference to a table, its supporting-platform, and, if desired, a series of seats connected therewith, such as is used on floating vessels or other similar structures subject to variation from a horizontal position as to the deck or floor levels.

The objects in view have been to provide a rigid platform structure adapted to support a table and a chair or chairs so mounted on the floor or deck as to be capable of movement in any direction with relation to the varying levels of the floor or deck and also provided with a rigidly-connected stem, together with means connected with the stem for maintaining it in a vertical position, whereby the platform and its supported articles of furniture are normally maintained in a relatively horizontal plane.

The invention also refers to and includes the means whereby a single platform or a series

or plurality of such supporting devices and their superimposed tables and chairs are simultaneously controlled and maintained so that the table will be constantly held in a horizontal position and the chairs in unvarying relation to the table, as indicated.

Referring now to the drawings, 2 represents the floor or deck of a vessel, with which is incorporated the platform 3, circular in form, the upper surface of which is adapted to conform to the general floor-level of the deck when horizontal. The deck is provided with a circular bowl-shaped cavity adapted to receive the platform 3 and is preferably provided with an interior concave lining or ball-bearing support 4, in which are mounted ball or roller bearings 5. The platform 3 is also provided around its outer edges with a correspondingly-shaped exterior bearing 6, adapted to neatly rest within the bowl-cavity and to permit the surrounding deck to move with relation to the platform in any direction.

Rigidly connected with the platform 3 is a stem 7, provided with a ball 8 or other equivalent universal joint member, with which is connected the controlling gravity-actuated frame. As thus constructed it will be seen that if the stem 7 is maintained in a vertical position independent of the deck the surrounding edge of the deck may rise or fall at any point (either longitudinally or laterally) and that the floor-surface of the platform 3 will remain horizontal and will maintain a close interfitting joint with the surface of the bowl-cavity. It will be understood that to insure such interengagement the outer spherical surface of the bearing member 6 and the inner spherical surface of the bowl-lining 4 have common radii centering in the vertical center of the platform at or about its floor-level. A particular feature of advantage of this construction is that the passage of small articles between the floor is prevented, as is likewise the engagement of skirts or other similar material, while a finished appearance is always insured.

Rigidly mounted on the upper surface of the platform 3 by any suitable support are one or more articles of furniture, as the table

9 and seats 10, in proper relation to each other and the surface of the floor for convenience of the occupant, as will be readily understood.

The ball 8 is provided with a surrounding
5 ball-bearing 11 or other equivalent universal joint member of any suitable design adapted to provide for free movement or oscillation and with which bearing are connected the rods or other elements 12 of a lower depending
10 frame, by which the stem 7 is always maintained in a true vertical position.

As shown in Fig. 3, the rods 12 of the framework diverge in opposite directions from the ball-bearings 11 both longitudinally and laterally and are connected in one entire structure by a surrounding similar frame, while diagonal truss-rods 14 or any other suitable bracing elements are incorporated with the frame, so as to provide a rigid depending
20 structure on a normally general plane. As shown in Fig. 3, a series of six tables are assembled and connected with such controlling-framework, although it will be readily understood that a single table or any desired number may be arranged according to the dimensions or design of the vessel, or they may also
25 be arranged in a continuous line, and we have not considered it necessary to show such arrangements, as they are more properly within
30 the province of the designing engineer or builder.

At the corners of the controlling-frame and at intermediate positions, if desired, are located supporting stems or rods 15, provided
35 at their upper portions with balls 16, which rest in universal joint ball-bearings 17 of any suitable design, preferably provided with interior annular ball-bearings 18, and located in the floor or deck 2 on substantially the
40 same level or plane as the center of the spherical or bowl-shaped platform-bearing. This construction and arrangement is clearly illustrated in the drawings, more particularly in the diagrammatic view of Fig. 4. The
45 stems 15 are provided with lower supporting-balls 19, around which are the embracing ball-bearings 20 of the controlling-framework either at the corners thereof or at intermediate positions, by which supports the framework is properly supported. It will also be
50 understood that portions of the weight are carried by balls 8 of the stems 7.

To the lower end of the stem 15 are attached the gravity weights or balls 21 of suitable weight and resultant leverage and designed to suit varying conditions for each particular case, but preferably of such weight as to provide effective inertia. As thus constructed it will be seen that the weights 21
60 will tend to hold the stems 15 in a vertical position by the force of gravity, and by reason of the fact that all of the stems 15 are connected by the rigid frame 12, 13, and 14 it will also be seen that the force of each weight
65 will be exerted throughout the framework in

every direction, so as to control the tendency of any of the supporting elements to assume other than a vertical position, and all the stems will be positively controlled by the rigid frame and will be maintained in a vertical
70 position. This is due not only to the accumulated inertial force of the connected weights, but also to the excessive leverage which results from their joint and simultaneous operation, exerted through the frame in all directions against the lower end of the stems 7.
75 The leverage of the frame as thus constructed is proportionally greater than the tendency of the stems or their supported furniture to deviate from vertical or horizontal positions,
80 respectively, independent of whatever load is carried by the table or however distributed.

By this construction of the platform 3, whereby its supporting-bearings are located around a comparatively large spherical surface, friction is reduced, resulting in greater ease of operation and sensitiveness to the controlling-frame. By locating these bearings thus between the upper and lower surfaces and in the body portion of the floor itself we
90 have obviated the necessity of other forms of bearings, and the necessity of such or other supporting-frameworks either above or below the floor or supporting level is entirely avoided.
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We are aware that self-leveling devices for furniture have been patented wherein a counterweight is attached to the vertical stem of an upper table; but we believe that we are the first to provide the mechanism shown and described whereby the corrective inertial action of a frame and a series of surrounding connected weights is applied to one or a series of pendently-arranged supporting-stems. We believe we are also the first to provide an integral table and chair support or, in fact, any integral support for a plurality of articles or furniture mounted upon an annular bearing and provided with a stem controlled by independently-acting and independent supporting-weights.
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The operation is obvious from the foregoing description.

The advantages of the invention will be appreciated by all those who are skilled in the art. It is very efficient, simple, durable, and inexpensive and is capable of installation without interference with the head-room under decks, while requiring but a minimum of space either above or below.
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Changes and variations may be made in the design, proportions, arrangement, or other details of construction by the skilled mechanic; but all such are to be considered as within the scope of the following claims.
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What we claim is—

1. A self-leveling furniture-support consisting of a movable floor structure provided with a bowl-shaped receiving and supporting cavity having internal bearing-surfaces, a
130

platform adapted to interfit therein, and means for maintaining the platform in a horizontal position, said means being supported independently of the platform and connected therewith, substantially as set forth.

2. A self-leveling furniture-support consisting of a movable floor structure provided with a bowl-shaped receiving and supporting cavity having internal bearing-surfaces, a platform adapted to interfit therein, and gravity-actuated controlling means suspended from bearings on a plane corresponding with the level of the floor structure and connected with the platform, substantially as set forth.

3. The self-leveling apparatus consisting of a floor structure provided with a bowl-shaped receiving and supporting cavity, a platform adapted to interfit therein and aline therewith provided with a vertical stem, ball-bearings interposed between the walls of the cavity and the platform, an article of furniture secured to the upper surface of the platform, and a controlling-framework suspended from bearings located on the floor-level and connected with the platform-stem for maintaining the platform in a horizontal position, substantially as set forth.

4. In a self-leveling apparatus, the combination with a movable floor provided with a spherical-shaped cavity having an internal bearing, of the correspondingly-shaped platform adapted to interfit therein and to aline with the floor-surface, a controlling-stem therefor, and a gravity-controlled frame connected with the stem and suspended from bearings in the floor and on substantially the same plane therewith, for maintaining the platform in a horizontal position independent of the movement of the floor, substantially as set forth.

5. In a self-leveling apparatus, the combination with a movable floor provided with a spherical-shaped cavity having an internal

bearing, of a correspondingly-shaped platform adapted to interfit therein and aline with the floor-surface, a downwardly-extending controlling-stem, a gravity-actuated controlling-frame in engagement with the stem, and a series of depending weights connected with the frame, and suspended from bearings on a plane passing through the center of the spherical cavity and platform, substantially as set forth.

6. In a self-leveling apparatus, the combination with a movable floor provided with a spherical-shaped cavity having an internal bearing, of a correspondingly-shaped platform adapted to interfit therein and aline with the floor-surface, a downwardly-extending controlling-stem, a gravity-actuated controlling-frame in engagement with the stem, and a series of depending weights suspended from the floor by universal joints on the floor-level and connected with the frame, substantially as set forth.

7. In self-leveling apparatus, the combination of a movable floor or deck provided with a spherical-shaped cavity having an internal lining and ball-bearings, a correspondingly-shaped platform adapted to interfit therein and to aline with the floor-surface and having a downwardly-extending controlling-stem, a series of laterally-disposed depending stems and weights supported in universal bearing-supports on a plane substantially level with the floor-surface, and a controlling-framework connected with said stems and with the platform-stem by universal bearings, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

GRANT W. BOSTWICK.

ROBERT W. BOSTWICK.

Witnesses:

JAMES McC. MILLER,

C. M. CLARKE.