

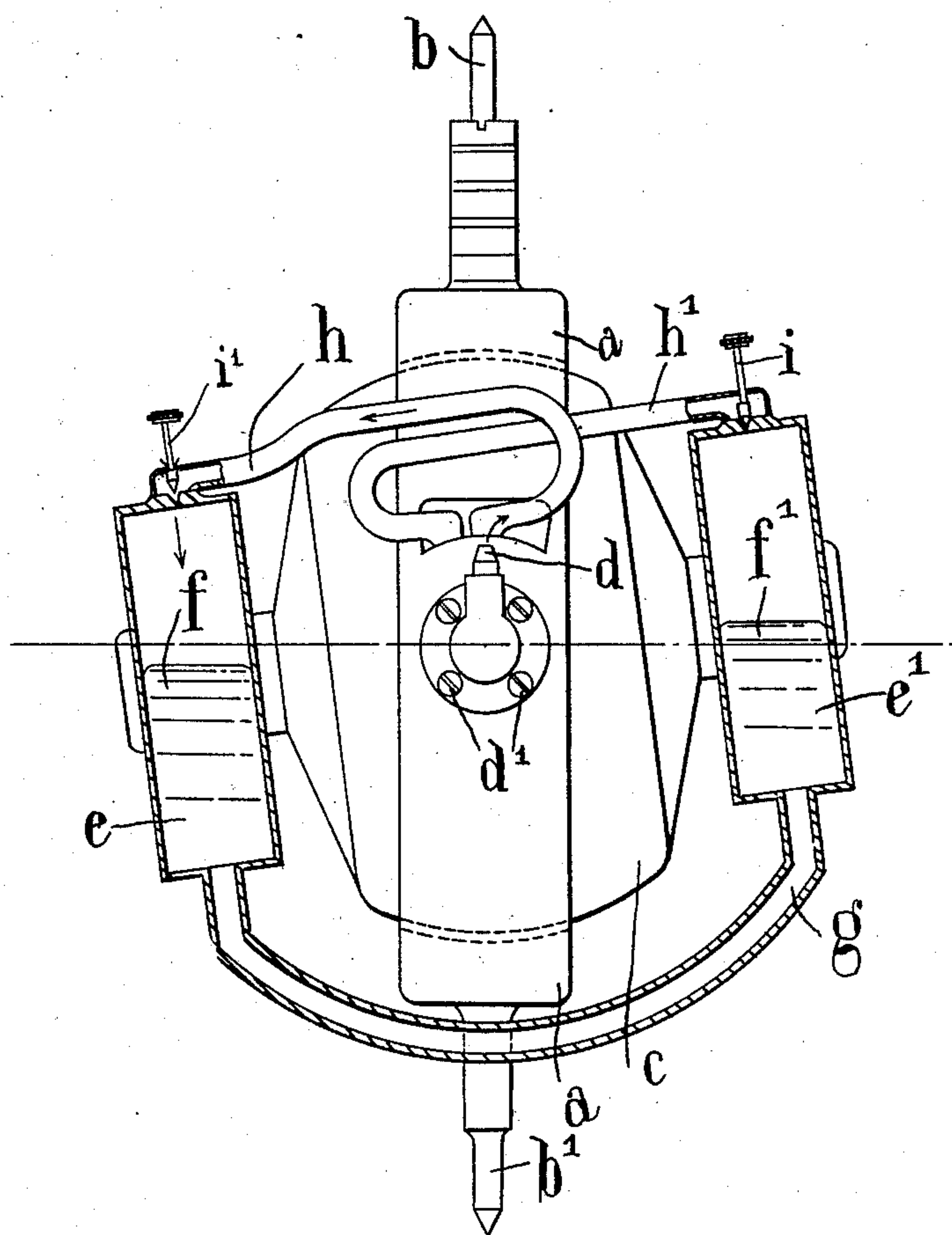
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GYROCOMPASS

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## UNITED STATES PATENT OFFICE

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## GYROCOMPASS

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The invention relates to gyro-compasses, its main object being to simplify the structure of such instruments.

The invention consists in the improvements in gyrocompasses hereinafter described and particularly pointed out in the claims.

In carrying the invention into effect according to one form as shown with the tilt exaggerated in the accompanying diagrammatic figure, the vertical ring is indicated by the letter *a*, the pivots *b*, *b'* enabling it to turn about a vertical axis. Within the vertical ring, the gyro-casing, *c*, is pivoted to turn about an axis at right angles to the plane of the paper, the gyro-casing pivots to permit this movement being in the form of hollow trunnions to allow compressed air from within the casing to pass to the nozzle, *d*, secured to the vertical ring, *a*, by screws *d'*. Within the gyro-casing, the gyroscope itself (not shown) is rotated in any suitable manner. Attached to the gyro-casing one at each end as shown is a pair of bottles, *e*, *e'*, containing mercury, *f*, *f'*, the bottles being connected below by a tube, *g*, of restricted cross-section and adjustable if desired by any suitable means. Pipes, *h*, *h'*, are connected respectively to the upper parts of the bottles, *e*, *e'*, and cross one another so that their open ends are disposed as shown in relation to the air nozzle, *d*. Control of the flow of air into the bottles through the pipes, *h*, *h'*, is effected by means of the needle or like valves, *i*, *i'*.

As the gyro-casing tilts, mercury under the influence of gravity flows down to the lower bottle thereby giving the sensitive element an arc-in-azimuth or north-seeking movement while damping is effected by pressure-air acting on the surface of the mercury in the bottles, the necessary lag or phase-difference for this purpose being effected by adjustment of the valves, *i*, *i'*.

It will be obvious that many variations of or departures from the illustrative example above described may be made without exceeding the scope of the invention.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a gyro-compass, a gyro-casing, sup-

ported to tilt about a horizontal axis perpendicular to the axis of spin, a pair of bottles interconnected for the flow of liquid therebetween and carried by the casing on opposite sides respectively of its axis of tilt and positioned to contain a liquid whose flow from one bottle to the other to effect north-seeking is due to gravity as the casing tilts, and means brought into action as the casing tilts for applying pressure to the liquid in the lower bottle to effect north-settling by damping about the horizontal axis.

2. In a gyro-compass, a gyro-casing supported to tilt about a horizontal axis perpendicular to the axis of spin, a pair of bottles interconnected for the flow of liquid therebetween and carried by the casing on opposite sides respectively of its axis of tilt and containing a liquid whose flow from one bottle to the other to effect north-seeking is due to gravity as the casing tilts, and means brought into action as the casing tilts for applying pressure to the liquid in the lower bottle out of phase with said gravity flow to effect north-settling by damping about the horizontal axis.

3. In a gyro-compass, a gyro-casing supported to tilt about a horizontal axis perpendicular to the axis of spin, a pair of liquid-containing bottles interconnected for the flow of liquid therebetween and carried by the casing on opposite sides respectively of its axis of tilt for effecting north-seeking of the casing, a vertical ring in which said casing is tiltably mounted, a nozzle mounted on said ring and in communication with said casing, and means forming ducts each connected at one end to the top of its respective bottle, the other ends being open and so disposed with respect to said nozzle that, on tilting of the casing, air pressure is increased in that bottle which has been lowered.

4. In a gyrocompass, a gyro-casing supported to tilt about a horizontal axis perpendicular to the axis of spin, a pair of liquid-containing bottles interconnected for the flow of liquid therebetween and carried by the casing on opposite sides respectively of its axis of tilt for effecting north-seeking of the casing, a vertical ring in which said casing is tilt-



ably mounted, a nozzle mounted on said ring and in communication with said casing, and means forming ducts each connected at one end to the top of its respective bottle, the other end being open and so located that, when the casing is untilted, they are symmetrically disposed with regard to said nozzle, but each is to that side of said nozzle opposite to that occupied by the bottle with which it communicates.

5. In a gyrocompass, a gyro-casing supported to tilt about a horizontal axis perpendicular to the axis of spin, a pair of liquid-containing bottles interconnected for the flow of liquid therebetween and carried by the casing on opposite sides respectively of its axis of tilt for effecting north-seeking of the casing, a vertical ring in which said casing is tiltably mounted, a nozzle mounted on said ring and in communication with said casing, means forming ducts each connected at one end to the top of its respective bottle, the other ends being open and so disposed with respect to said nozzle that, on tilt of the casing, air pressure is increased in that bottle which has been lowered, and a valve in each of said ducts whereby the rate of flow of air in said ducts may be varied.

In testimony whereof I have signed my name to this specification.

SIDNEY GEORGE BROWN.

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