K. A. KRETSCHMAR.

AERONAUTICAL COMPASS.

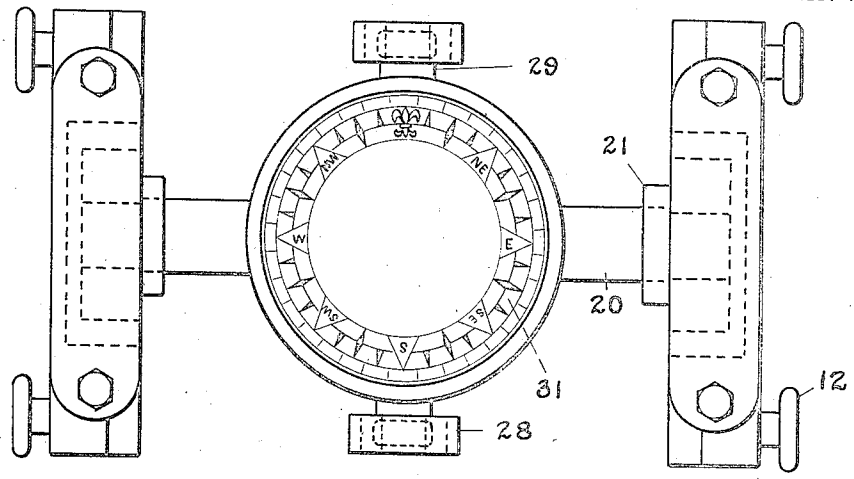
APPLICATION FILED APR. 8, 1920.

1,416,841.

Patented May 23, 1922.

2 SHEETS—SHEET 1.

Fig.1



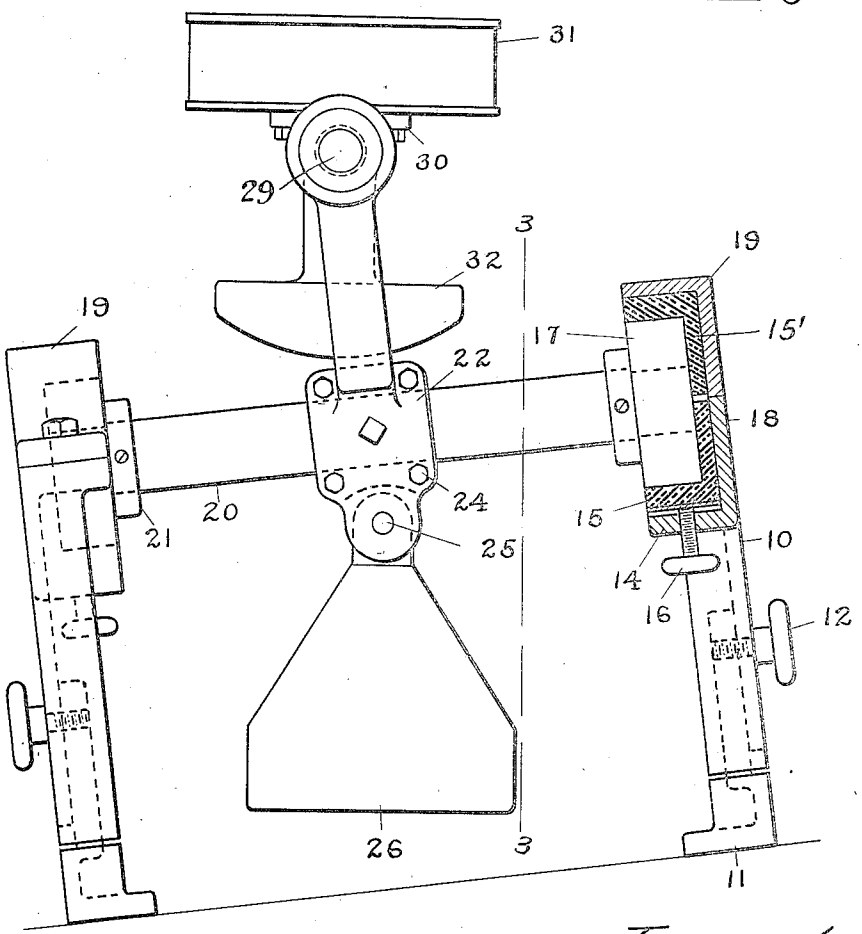


Fig.2

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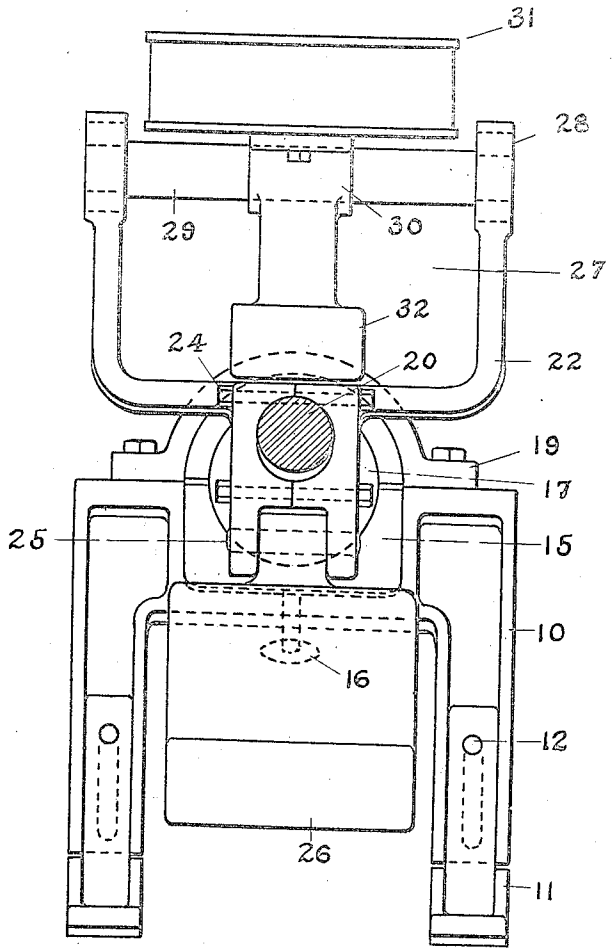
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2 SHEETS—SHEET 2.

Fig 3



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UNITED STATES PATENT OFFICE.

KARL A. KRETSCHMAR, OF PALMER, MASSACHUSETTS.

AERONAUTICAL COMPASS.

1,416,841. Specification of Letters Patent. Patented May 23, 1922.

Application filed April 8, 1920. Serial No. 372,233.

To all whom it may concern:

Be it known that I, KARL A. KRETSCHMAR, a citizen of the United States, residing at Palmer, in the county of Hampden and State of Massachusetts, have invented a new and useful Aeronautical Compass, of which the following is a specification.

This invention relates to a mounting for a compass for use on air-planes and air-ships, although the same compass can be used in marine navigation, with or without change. Its principal objects are to provide a means of support for a compass which will permit of all the changes in direction of an air-ship that can possibly take place and which will at all times remain in a horizontal plane and right side up; and to provide an arrangement whereby the navigator can use the compass as a means of showing whether he is sailing horizontally or otherwise and employ it for guiding his course back to a normal horizontal one.

There are times in which an air navigator is unable to tell in what direction he should go to sail on an even keel except by the use of expedients, which are more or less uncertain, such as throwing articles out and watching their course in the air. This compass, in addition to its main object, serves the purpose of enabling him always to find his true course, and find the horizontal and vertical directions.

The invention also involves the use of improved means for supporting the compass, improved means for absorbing any vibration, and other improvements in details of construction as will appear.

Reference is to be had to the accompanying drawings, in which—

Fig. 1 is a plan of a compass and its support constructed in accordance with this invention;

Fig. 2 is a side view, partly in section, showing it in the position assumed when the air ship is rising, and

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 2 showing the compass frame in end elevation but at the same inclination.

The main support is shown as comprising two end frames. They have four legs 10 which are mounted on feet 11 with an adjusting connection between them. This adjustment is shown in the simple form of a headed screw 12 passing through the lower part of each leg and engaging the top of each foot for holding the two parts in any desired adjusted position. It is not absolutely essential to have each leg adjustable as one at least, can be of constant length and the others adjusted to fit it. The feet 11 are screwed down to a floor or the like.

Each of the end frames, comprising two end legs, has a projection 14 fixed with respect to the two legs and supporting a semi-circular rubber buffer 15 which is L-shaped in cross section. This is adapted to be adjusted vertically by a screw 16 and supports a ball bearing cage 17 on its upper concave surface. Above the buffer 15 is a similar buffer 15′. The upwardly extending part at the end of the frame projects behind this cage and bears on the vertical wall 18 constituting a part of the frame. This buffer, therefore, absorbs both vertical and horizontal shocks. The up-right portion 18 also has a cap 19 covering the top of the ball bearing cage at one side to protect it from accidental injury.

In the two ball bearing cages 17 a main shaft 20 is supported, collars 21 being shown for limiting its position endwise with respect to these cages. This shaft carries in its center, fixed to it in any desired way, a frame 22. This frame is shown as in two parts clamped to the shaft by bolts 24. At the bottom by means of a pivot 25, it carries a depending weight 26 which is free to swing in a longitudinal plane through the center of the shaft.

The frame 22 has an open space 27 above the shaft and carries above this at its ends, two ball bearing cages 28 for the ends of a transverse shaft 29. On the shaft 29 are fixed a pair of members 30 which constitute the frame on which the compass 31 is directly carried. This is the compass frame proper. These members are fixed together in substantially the same way as the two parts 22 and have fixed to them a weight 32 at the bottom. This construction, consisting of the parts 30, 31 and 32, is entirely rigid and is fixed rigidly to the shaft 29. This weight 32 is located in the passage 27 and is capable of swinging therein. Furthermore, this passage is big enough to permit the compass itself to swing through too so that in case the machine turns over, the compass will follow it around and its upper surface will remain in horizontal position at all times. Furthermore, it will be seen that in case the machine swings

over in the other direction and turns all the way over, the compass will also remain in horizontal position and stay at the top because the weight 26 will always depend toward the earth from the shaft 20. The compass frame 30 always stays in vertical position.

It will be seen also that when the machine is tipping and the compass is therefore swinging about the shaft 29, the weight 26 is also free to swing on its pivot to keep the compass in proper position with respect to the other shaft.

From what has been said, it will be seen that the device is universally adaptable to all positions of the machine, and that the upper surface of the compass can be depended on by the operator to be always in a horizontal plane so that he can use this as a guide under all conditions of darkness and distance from the earth to guide him back to a horizontal plane and enable him to direct his machine in whatever direction he desires to go. This universal adaptability of the device is an important feature because aviators have had great trouble in many instances in finding out how they are sailing and in what direction it would be necessary to go in order to return to the horizontal before trying to make the objective point, for when sailing at high speed, it is often difficult to be certain as to the relative position of the machine to the vertical.

Although I have illustrated and described only a single form of the invention, I am aware of the fact that many modifications can be made therein by any person skilled in the art within the scope of the invention as expressed in the claims. Therefore I do not wish to be limited to all the details herein shown and described, but what I do claim is:—

1. In a compass mounting, the combination of two shafts arranged at right angles to each other, two frames, one carried by each shaft and capable of swinging about the axis thereof, one frame also being supported by the other shaft and a weight located on each frame below its shaft for keeping said frames in the same position irrespective of the position or angle to which the support for the shaft is turned.

2. In a device of the character described, the combination of a support, a shaft carried thereby, a tilting frame on the shaft, a shaft carried by said frame, a compass frame fixedly mounted on the last named shaft, and a compass fixedly secured to said compass frame above the shaft, the compass frame being weighted below the shaft, said tilting frame being adapted to turn on an axis transverse to the axis of the other shaft.

3. In a device of the character described, the combination of a tilting frame, a shaft carried thereby, a compass frame fixedly mounted on said shaft, a compass fixedly secured to said compass frame above the shaft, the compass frame being weighted below the shaft, and a second shaft, said tilting frame being adapted to turn on an axis transverse to the axis of the first named shaft carried by said tilting frame and having a space below said second shaft through which the said weight and compass can pass as the compass frame turns.

4. In a device of the character described, the combination of a pair of end frames, a ball bearing cage carried by each frame, yielding means for supporting said cages from their frames, a shaft carried by said cages, a frame fixed to said shaft, a weight pivoted to the last named frame on a pivot below the shaft, and a compass supported by the last named frame and above the shaft and pivotally mounted with respect thereto.

5. In a device of the character described, the combination of a pair of end frames, a ball bearing cage carried by each frame, yielding means for supporting said cages from their frames, a shaft carried by said cages, a frame fixed to said shaft, a weight pivoted to the last named frame on a pivot below the shaft, the last named frame having bearings, a shaft in said bearings, a third frame fixed to said shaft, a compass rigidly secured to the third frame, and a second weight rigidly connected with said third frame below the second shaft.

6. The combination with a main frame having adjustable legs, the end legs constituting two separate frames, of a rubber buffer of L-shaped cross section carried by each of said frames and provided with a supporting surface, a ball bearing cage carried on each of these supporting surfaces, said rubber also having a portion projecting behind the cage to absorb endwise shocks, a shaft rotatably carried by said cages and a compass mounted on the shaft to turn therewith.

In testimony whereof I have hereunto affixed my signature.

KARL A. KRETSCHMAR.