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Parson, Jr.

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[54] **MECHANICAL COMPASS BEARING ATTACHMENT FOR BINOCULARS AND THE LIKE WITH COMPASS CARD CLAMPING MEANS**

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[52] **U.S. Cl.** **33/355**, 33/272, 33/364

[51] **Int. Cl.** **G01c 17/20**

[58] **Field of Search** 33/272, 355, 356, 364

[56] **References Cited**

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Attorney, Agent, or Firm—John E. Becker

[57] **ABSTRACT**

Magnetic compass bearing attachment devices for use as a separate entity and either with or without binoculars or the like for selectively and temporarily holding the bearing of the compass rose or card, after an object or target sighting has been made therewith. The devices are purely mechanical and include a weight-activated, pivotally mounted bell-crank lever system of which the weight, responsive to respective front and back tilting of the device during use, moves the card clamping end of the bell-crank lever between card-release and peripheral card-clamping positions. The weight in one form is connected at one side of the lever and is a float member immersed within damping fluid, as is the clamping lever, whereby a center of lift of the float shifts from one side to the other of a clamping axis to help effect said respective clamping lever positions with the clamping being in a direction from beneath a damping-fluid-immersed compass card. In another form the weight and clamping lever are disposed above a freely rotatable compass card, and an arm of the lever applies clamping pressure under the same basic principle of operation, but from above the compass card of a compass assembly which need not be of the damping fluid immersed type. A further refinement includes the provision of a tubular peep sight affixed preferably diametrically beneath the compass casing and transversely to the aforementioned pivotal clamping axis, to facilitate use of the devices independently of binoculars.

15 Claims, 9 Drawing Figures

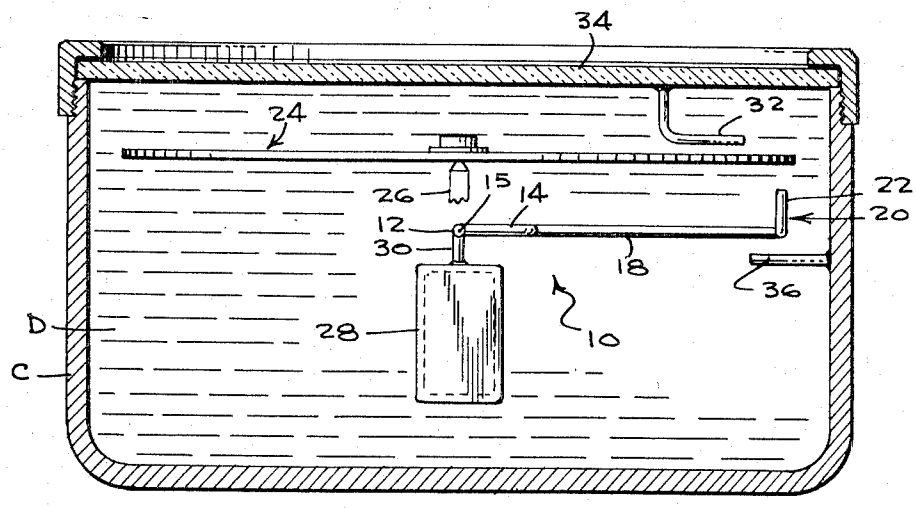
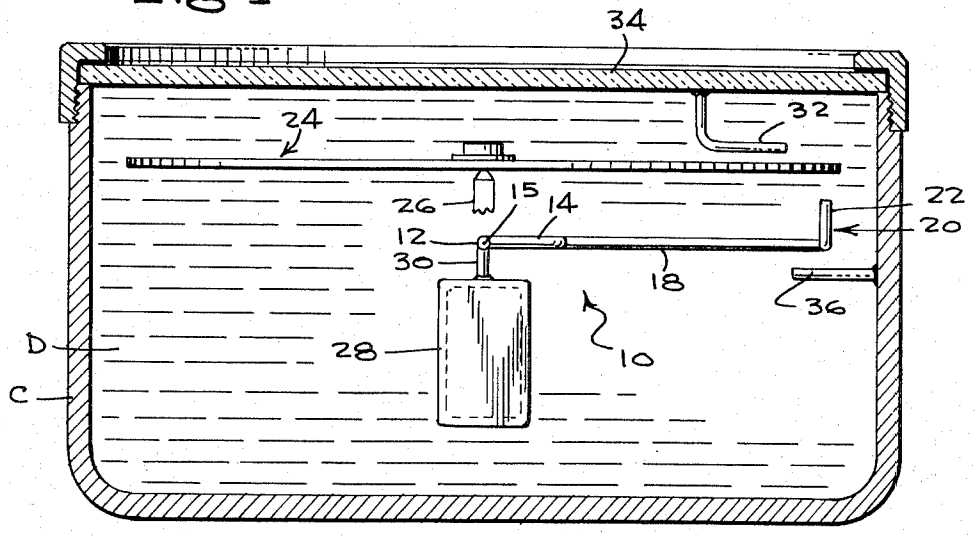


Fig-1


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12
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30
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36
D
28
10
C

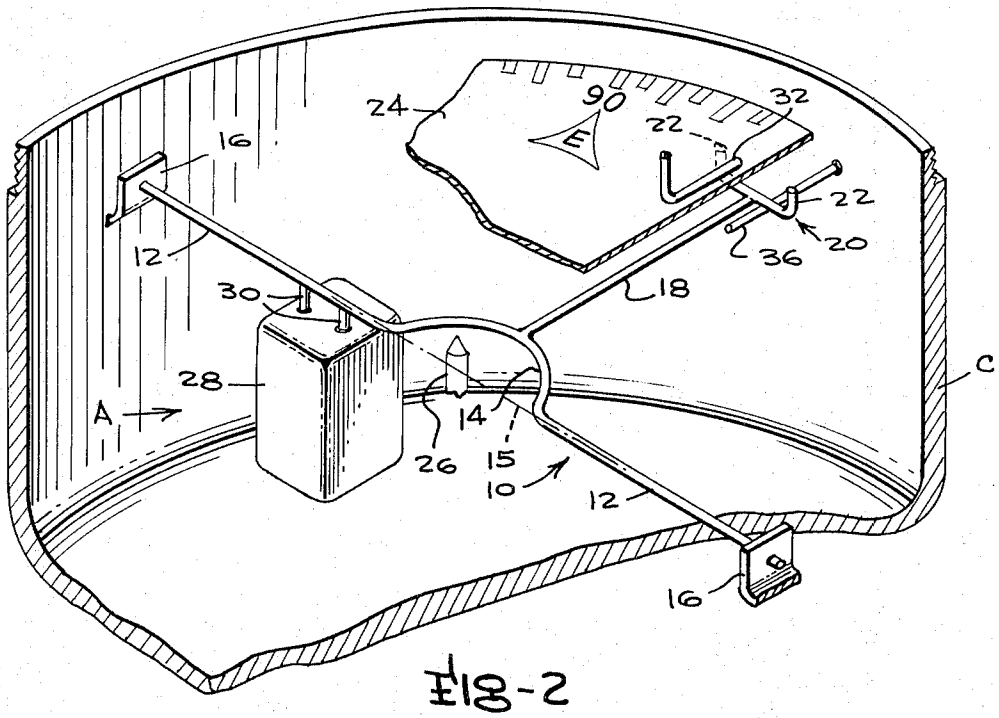

24
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32
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22
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36
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18
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28
A
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Fig-2

Fig-3

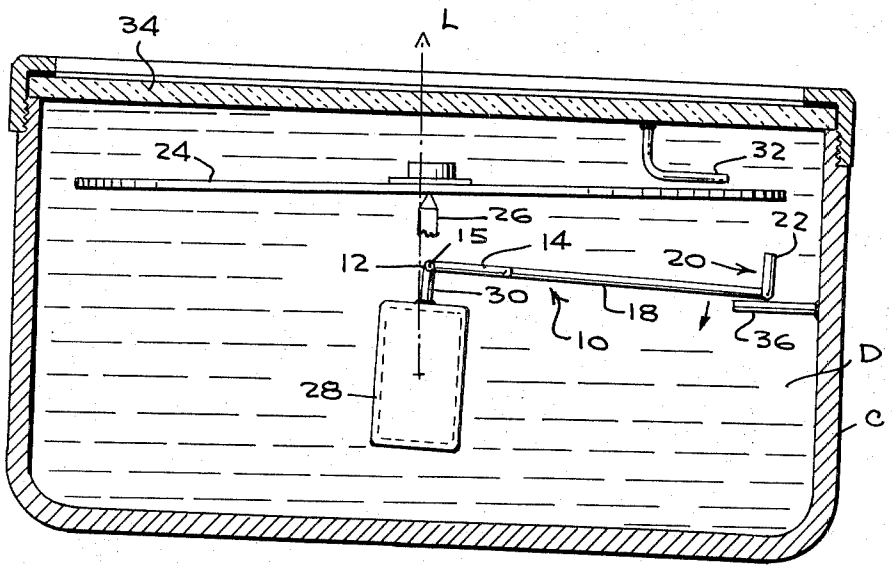

34
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Fig-4

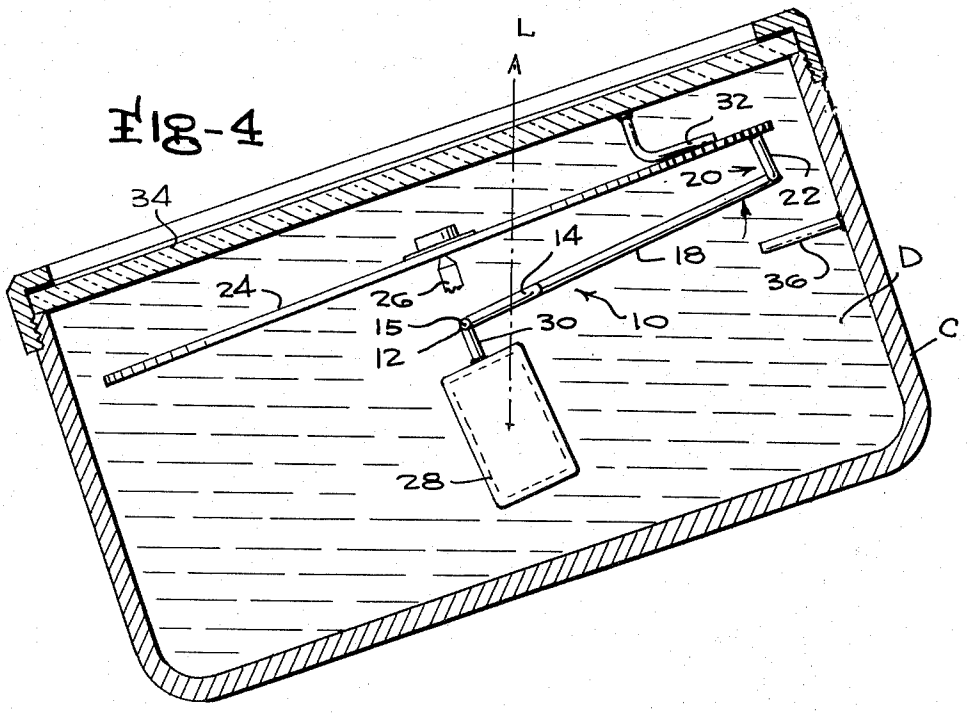

L
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C
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Fig-5

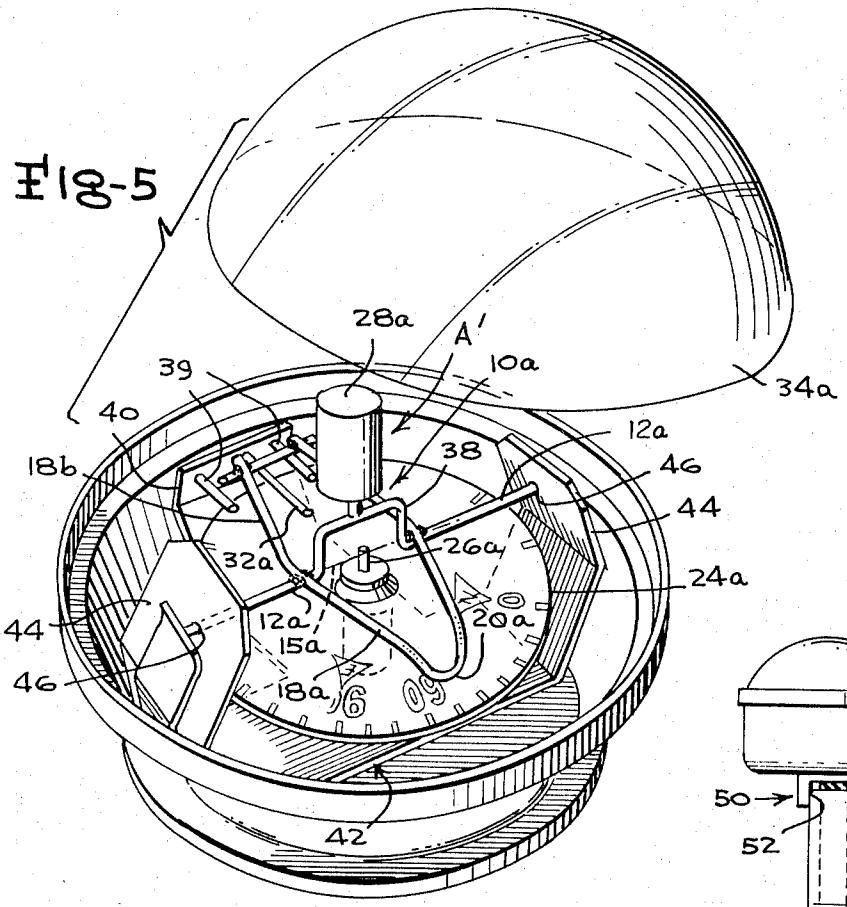


Fig-9

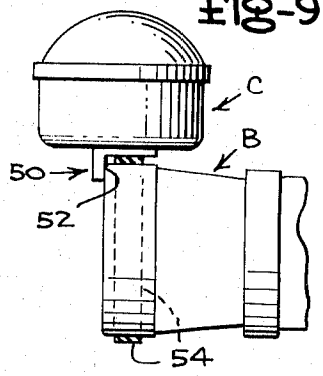


Fig-8

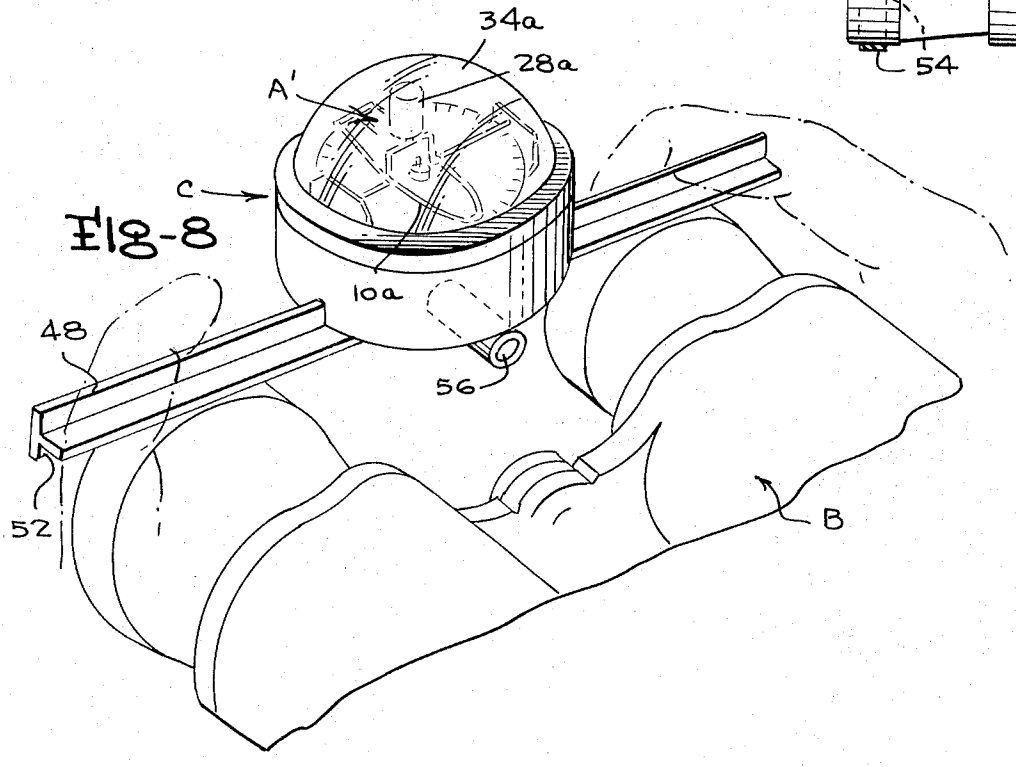


Fig-6

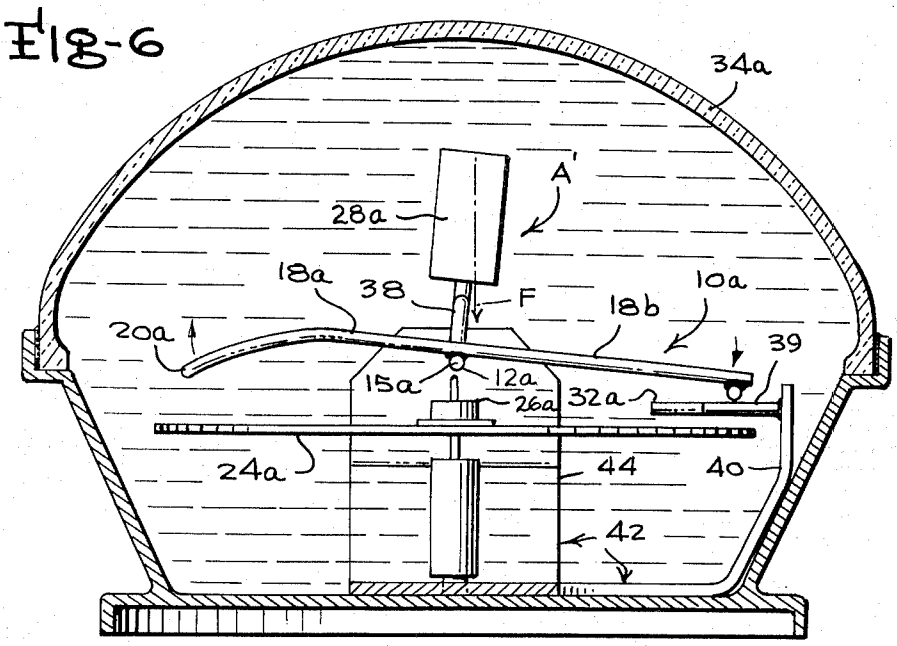
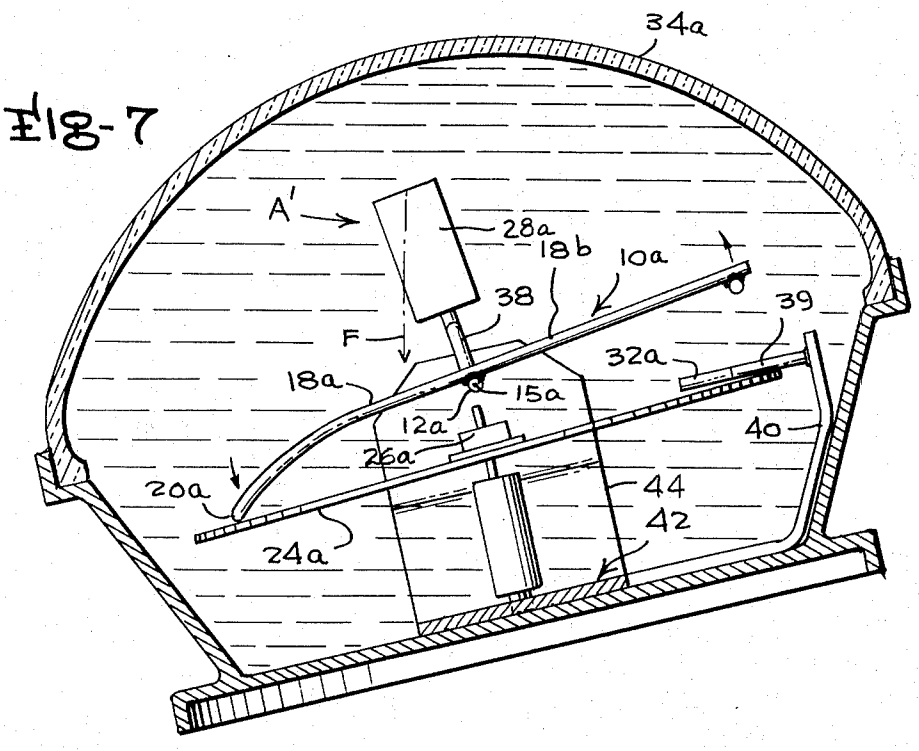

34a
A'
28a
18a
38
F
10a
18b
20a
39
15a
12a
26a
32a
24a
44
40
42

Fig-7


34a
A'
28a
18b
10a
38
39
F
32a
18a
15a
12a
40
26a
20a
44
42
24a

MECHANICAL COMPASS BEARING ATTACHMENT FOR BINOCULARS AND THE LIKE WITH COMPASS CARD CLAMPING MEANS

BACKGROUND AND OBJECTS OF THE INVENTION

The present invention relates in general to a binocular attachment having a magnetic compass and means for selectively and temporarily preserving or recording the bearing of the compass needle or card, for example, when a landmark, target or object is centered in the field of view of the binoculars, as when taking compass bearing readings at sea.

Heretofore, it has been a very difficult task to correctly and accurately read the compass bearings of distant objects which can be viewed through binoculars by an observer on board a boat or ship, particularly when one is trying to observe the compass bearing of identifiable objects or landmarks with conventional binoculars and a traditional hand-bearing compass. The accurate determination of the compass bearing of landmarks or objects which can be viewed through binoculars is often necessary or desirable for yachtsmen or others engaged in marine navigation, and for foresters and other outdoorsmen.

Various efforts have been made to develop devices which will alleviate the problems of obtaining reliable compass bearings of landmarks or objects by simultaneously sighting on the object and attempting to also view the portion of a compass card or the position of a compass needle indicating the bearing of the object being sighted. One of the devices which has been offered in an attempt to facilitate obtaining the compass bearing under such circumstances in an instrument known as a "hand-bearing compass," consisting essentially of a compass card which is viewed by means of a prism while the observer simultaneously looks over and beyond the prism to sight on the target. Certain difficulties and disadvantages attend this construction, and it is necessary to keep the target and a reference line or lubber line in register with each other and also to note their apparent position on the compass card, all of which must be done while attempting to keep the instrument level. This sometimes presents considerable difficulty, especially in rough weather.

Another device which has been offered on the market in an effort to alleviate the problems of making compass bearing readings, particularly on more distant objects, is the compass bearing binocular, wherein a compass is built into a pair of binoculars as an integral part of the binoculars. In that device a transparent compass card and lubber line are illuminated by a built-in lamp when the operator touches a button, superimposing an image of the transparent compass card and lubber line in the field of view of the binoculars superimposed on the object being viewed. This device presents certain disadvantages, in that the prospective user must pay the price for binoculars in addition to the price for a compass, even though be may already own binoculars of adequate quality and power for navigation or distance viewing. Furthermore, in order to note the compass bearing of the object being sighted in the binoculars, the user must concentrate on two factors in the field of view, first the centering of the target on the lubber line, and while maintaining the target accurately centered, reading and noting the compass bearing indicated by the compass card image in superimposed relation on the object.

A principal object of the present invention, therefore, is the provision of two similar forms of a novel compass bearing attachment for binoculars, which is produced as a separate entity capable of use with existing binoculars of conventional construction, and which has primarily mechanical means for providing a temporary or momentary readout or indication of the compass bearing of the binoculars at the time the binoculars are accurately centered on the target in the field of view.

It is another object to provide a reliable device of the foregoing character which is readily embodied into many presently available compasses, and thereby more conducive to relatively inexpensive manufacture and sale as a composite compass and readout attachment device.

Still another object is the provision of a mechanical device according to the preceding objectives which further is of the automatic or semi-automatic type and is readily usable either with or without binoculars in a manner utilizing very natural body and hand movements attendant the taking of a particular sighting.

SUMMARY OF INVENTION

The novel compass bearing attachment for binoculars of the present invention may merely be held on binoculars by finger pressure on a horizontal support member thereof which bears against the front barrel portion of conventional binoculars, and comprises further a compass needle and rotatable compass card, preferably immersed in a bowl of damping fluid, under glass, together with a float activated bell-crank type lever means having a clamping yoke at the lever end remote from the float hanging from the pivotal axis. The yoke can be made to selectively clamp the compass card from beneath against a readout pointer fixed to the compass housing or to the underside of the glass face, responsive to slight tilting of the binoculars toward the user to take the reading when accurately aimed at the target. Reverse tilting thereof releases the yoke clamping of the compass card from against the pointer whereby the clamping yoke end then engages against a fixed stop member on the side of the bowl.

The same objective is achieved in another mechanical form by a medially pivoted clamping lever having a central upwardly projecting arm-carried weight above its pivotal axis. The lever is pivotally mounted above the rotatable compass card within space normally available in compasses having transparent dome covers. It has front and back arm extensions which utilize basically the same principle as in the float form, except the clamping pressure of the one lever arm is downward from above, generally against the rear of the compass card. This causes the front of the card to rise against the fixed reference member, such as a lubber line or pointer, disposed between a pair of restraining pins attached to and projecting inwardly from support means at a side of the compass housing or bowl. When in the unclamped or free mode, the opposite end of the pivotally mounted clamping arm or lever rests against the top of the restraining pins.

A further refinement for this novel attachment device resides in the provision of a tubular peep sight fixed to the underside of the instrument device to facilitate use thereof apart from association with the binocu-

lars, while still retaining the convenience of the clamping feature. My novel device has significant advantages including that of being considered automatic in the sense that it is functionable without need to activate any electrical switches or levers to activate the mechanism. There is nothing mechanical or electrical fed into the bowl to make it function, and its simplified form lends itself to be readily applied to many existing compass units. In operation, the motions required of the user are very natural and logical, i.e., when using the binoculars to pick up the target, my novel device is generally held horizontally enabling the floating compass card to remain free. When it is desired to read the bearing, the device with or without the binoculars is tilted in a natural manner slightly upward toward the user and the card becomes momentarily clamped.

Other objects, advantages and capabilities of the present invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawings illustrating preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

FIG. 1 is a cross-sectional, semi-diagramatic view of a magnetic compass having in combination therewith one form of my compass card clamping device;

FIG. 2 is a fragmentary perspective view of the device of FIG. 1 better showing the basic components comprising the novel combination thereof;

FIGS. 3 and 4 are semi-diagramatic, fragmentary elevational views of the clamping device of FIGS. 1 and 2, showing respectively the card-free sighting position and the card-clamped reading position;

FIG. 5 is a perspective view of another form of my compass-card clamping device shown in assembly with a known prior art magnetic compass whose transparent cover dome has been removed;

FIGS. 6 and 7 are views similar to FIGS. 3 and 4, but relating to the form of FIG. 5 showing the respective card-free and card clamped positions;

FIG. 8 is a perspective view of still a further embodiment of a composite magnetic compass having my card-clamping device therein, and also showing it in use with binoculars, and

FIG. 9 is a side view showing a modified manner of associating the compass attachment to a pair of fragmentarily illustrated binoculars.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The embodiment of FIGS. 1–4 is depicted in association with a known form of magnetic compass and embodies a fluid immersed float-activated lever assembly generally designated A, which comprises a generally T-shape (in plan view) clamping lever 10 having coaxially extended arms 12,12 integrally interconnected by a small offset, preferably arcuate middle portion 14. The arms 12 terminate in free ends which are freely journalled in lever support bearing brackets 16 operatively connected to diametrically opposite sides of the conventional compass bowl or casing C. The aligned arms 12 constitute a clamping axis 15 and the arcuate portion 14 or other means of interrupting the middle of the lever 10 is for the purpose of non-interference with the centrally disposed well-known type pivotal mounting means 26 for the compass card 24. A clamping arm 18 projects from the middle area of the arcuate portion 14 extending transversely from the pivotal clamping axis and generally co-planar with arms 12,12. Arm 18 terminates at its outer end near the casing C preferably in a clamping yoke 20 and preferably having opposite ends 22 at least partially upturned for selective engagement with the outer peripheral underside portion of the conventional freely rotatable 360° magnetic compass card 24. A known type of mounting axis or pivot for card 24 is used and therefore is only shown schematically at 26. The card is understood to embody a magnetic pointing portion so that portion tends to always bear toward the magnetic pole.

The lever 10 further comprises a depending weight in the form of a float 28 which is disposed at an angle of about from 90°–95°, and which together with the compass card 24 and other lever components, is immersed in the usual damping fluid D within the casing C. The float 28 is rigidly connected preferably close to the arcuate center piece 14 in the stated depending fashion from one of the arms 12 by at least one and preferably two connecting members 30, which thus gives the lever 10 a bell-crank in a broad sense.

The compass of this general type has a fixed reference member usually in the form of a lubber line or pointer 32 which may be affixed to the underside of the glass face 34, as shown, or it may project from a side of the casing C or other suitable support means. The compass is always used in a manner which places the pointer at the side remote from the observer.

The position of the clamping yoke 20 is obviously controlled by the submerged float weight 28, as follows: When the compass device is held in a generally horizontal position, and preferably in association with binoculars as is normally the case when observing a target or distant object on the horizon, the center of lift L (FIG. 3) is on the side of the clamping axis away from the yoke 20, thereby causing the yoke to descend away from the peripheral edge of the card, where it abuts a fixed stop pin 36. This permits the card to rotate freely while sighting an object. When the object or target has been satisfactorily centered in the binoculars' field of sight, and the observer wishes to read or determine the compass bearing of the object, he merely tilts the binoculars and associated compass attachment upward in a natural manner toward the user, whereby the center of lift L of the weight float 28 shifts reversely past the clamping axis 15 to the side toward the yoke 20. The bell-crank character of lever 10 thus causes the arm 18 and attached yoke 20 to rise through a clamping moment whereby yoke 20 clamps the underside of the compass card 24 against the pointer 32, thereby restraining card movement until a reading has been completed. Thereafter reverse tilting effects the release of the card 24 until another reading is desired whereupon the procedure is repeated.

The same basic operation and objective is achievable in the slightly different form illustrated in FIGS. 5–8, now to be described.

In this form the associated clamping lever and shifting weight assembly generally designated A', is disposed above the compass card 24*a* thereby requiring adequate space between the card and transparent cover, which in this embodiment is preferably of the dome type 34*a*. Many of the parts of this embodiment are correspondingly similar to those of the FIGS. 1–4 embodiment, will be identified generally by the same

corresponding reference numbers but having a suffix character "*a*" applied thereto. The parts are fabricated of relatively rigid thin stock wire, plastic or the like material, and when painted flat black are barely visible and do not interfere with the reading of the compass card.

The co-axial arms **12***a*,**12***a* of clamping lever **10***a* are medially interrupted so as not to interfere with the card pivot axis **26***a*. A bridge or yoke portion **38** projects upwardly from and at generally right angles relative to the arms **12***a* constituting the clamping axis **15***a*. A lever-pivoting weight **28***a* is attached atop the lever yoke **38.** Lever **10***a* includes a first arm means **18***a* corresponding generally to clamping arm **18** of the first-described embodiment. Lever **10***a* differs from lever **10** by the inclusion of a further oppositely extending arm means **18***b*. The arm means **18***a* and **18***b*, as illustrated, comprise laterally spaced arm members disposed transversely to and preferably generally coplanar with the arms **12***a*,**12***a*. The clamping arm **18***a* terminates in a slightly offset arcuate clamping finger **20***a*, and the lever **10***a* is disposed such that finger **20***a* is oppositely remote from the fixed pointer **32***a*. Pointer **32***a* and a pair of laterally spaced stop pins **39,39,** project generally co-planarly from one arm **40** of a T-shaped support bracket **42.** Bracket **42** also comprises oppositely extending arms **44,44** having upturned ends provided with aligned apertures or other suitable bearing means **46** to pivotally support shaft arms **12***a*.

The principle of operation of this embodiment is basically the same as in the first described "float" embodiment except that when it is desired to take a reading the clamping pressure is applied downward on the rear peripheral top part of the card, which is disposed opposite that where the pointer **32***a* and stop pins **39** are disposed. The downward pressure of clamping finger **20***a* on card **24***a* results from the slight natural tilting toward the user of the compass and clamping assembly A′ as shown in FIG. **7,** whereby the weight has shifted from the non-clamping position of FIG. **6** so that downward force F of the weight is behind the clamping axis **15***a* thereby tilting the forward peripheral portion of the card **24***a* upwardly to a limited extent against the restraining or stop pins **39,39.** While the use of a spaced pair of stop pins **39,39** provide for more positive clamping of the card, it is understood that the clamping action could take place relative to the fixed pointer or lubber line **32***a*, as in the first embodiment. Similarly, the remote end of lever arm means **18***b* is preferred to rest upon the top of the stop pins **39,39** when the clamping lever **10***a* is in the non-clamping position, although if the pointer **32***a* were of sufficiently rigid form, said lever end could rest thereon in lieu of upon the stop pins **39,39.** Often the latter proposal may not be feasible, particularly where the pointer needle **32***a* is preferred to be of very slender form which may become easily deformable from repeated engagement by the tilting lever **10***a*.

My novel compass attachment is particularly usefully associated with binoculars by the manner shown in FIG. **8** wherein a laterally elongated support member **48,** provided on the lower portion of compass casing C, permits the compass attachment to rest upon the barrel tops of the binoculars B and retained thereon either by light finger pressure or suitable temporary holding means not shown in FIG. **8.** If the member **48** is of generally T-shaped cross-section as shown in FIG. **8,** or of L-shape or right angular cross-section **50** as shown in FIG. **9,** the angular seat **52** will serve to orient the attachment on the front of the binocular barrels. In the form of FIG. **9,** a form of optional retaining strap or clip means, which may be elastic, is shown at **54.**

A further refinement has been added to the form of FIG. **8** in that a tubular peep sight **56** is shown attached in a preferably centrally disposed manner to the bottom of the compass attachment. It is conceiveable that a similar peep sight could be disposed upon suitable superstructure above the compass if desired. This provides the further advantage of permitting use of the compass attachment to make a sighting independently of the binoculars.

The foregoing detailed descriptions are believed to render the construction and functional operations very clear without need of further review. Accordingly, it is apparent from the preceding detailed descriptions that various novel and fully effective forms of my compass attachment have been evolved which achieve all the objectives and advantages set forth in the introductory portion and throughout this application.

Various changes and alterations may be made by those skilled in the art without departing from the inventive spirit, the following being among such changes contemplated. Alternative constructions contemplate the use of fixed axially aligned stub axles or shaft portions projecting inwardly from opposed sides of the casing C, to be used in lieu of the rotatable shaft ends **12,12** and fixed bearing brackets **16,16** in FIG. **2,** and in lieu of items designated at **12***a* and **46** in FIG. **5.** The lever **10** would then embody circular bearing sleeve portions at opposite sides of the arcuate portion **14** for cooperation on the inner ends of the fixed stub shafts, and at least one float weight would be attached to one, if not both, of the contemplated bearing sleeves in the same depending manner. It is contemplated that a similar type of mounting could be evolved for lever **10***a* in the FIG. **5** embodiment, which also contemplates the use of uninterrupted pivot shafts and clamping levers in their medial area, where space limitations within the compass assembly are such as not to have the clamping lever assembly interfere with the center pivot mounting of the freely rotatable compass card. Even where open center construction of the clamping lever is desired, the front and back arms **18***a* and **18***b* of lever **10***a* could be made of single member form similar to arms **18** of FIG. **2.**

It is apparent that the aforestated changes as well as other revisions may be made without departing from the inventive scope as defined in the appended claims.

I claim:

1. A magnetic compass bearing attachment for binoculars and the like, comprising in combination:

a. a magnetic compass assembly having a casing, a freely rotatable compass rose card and a relatively stationary reference member disposed above said card; said compass card being rotatably mounted on vertical pivot means provided generally centrally of said compass assembly;

b. mechanical clamping lever means connected with said casing for selectively clamping said compass card for temporarily maintaining the compass bearing after sighting upon an object or target;

c. said clamping lever means comprising a weight and a weight-activated, pivotally mounted bell-crank

clamping lever mounted upon pivot-forming means constituting a horizontal, generally diametrically disposed pivotal clamping axis, said weight attached to said lever and said lever having a clamping end movable between card-release and peripheral card-clamping positions responsive to respective front and back tilting of said attachment, and said weight being disposed to correspondingly shift transversely to and both in front and back of said pivotal clamping axis to effect said respective clamping lever positions.

2. An attachment as defined in claim **1** wherein said compass assembly further comprises a supply of damping fluid housed within said casing and within which fluid the compass card and clamping lever means are immersed; said clamping lever attached weight being in the form of a fluid immersed float member connected in a depending manner by a lever arm to a side of said bell-crank lever remote from said clamping end, whereby a center of lift of said immersed float shifts in accordance with said front and back tilting of said attachment, thereby helping to effect said respective clamping lever positions of said lever clamping end, with clamping pressure being applied from beneath said compass card.

3. An attachment as defined in claim **1**, wherein lever stop means are provided in said magnetic compass assembly to effectively limit the lever travel responsive to said front and back tilting thereof, said stop means comprising at least one generally horizontally projecting pin member fixed at one side of said casing.

4. An attachment as defined in claim **1** wherein said clamping lever is disposed relative to said compass card so that in the card-clamping position said compass card is clamped from beneath and held against said stationary reference member.

5. An attachment as defined in claim **1**, wherein said clamping end of said clamping lever is in the form of a yoke having equal length clamping fingers, and said clamping lever is disposed so that said yoke clamping fingers engage said compass card from beneath and hold it against said stationary reference member while straddling said reference member, responsive to a tilting in the back direction of the compass assembly.

6. An attachment as defined in claim **1**, wherein lever abuttment means are provided in said compass assembly to effectively limit the lever travel responsive to said front and back tilting, said lever abuttment means including fixed stop pin means disposed at one side of said casing to effectively limit lever travel in both the card clamping and card release positions.

7. An attachment as defined in claim **1**, wherein said pivot forming means for mounting said clamping lever include horizontal shaft means formed unitarily with said lever, and fixed bearing bracket means provided near diametrically opposite sides of said compass casing for rotatively supporting said shaft means.

8. An attachment as defined in claim **7**, wherein said compass assembly further comprises a supply of damping fluid housed within said casing and within which fluid said compass card and weight-activated clamping lever means are immersed, said lever means further including a fluid-immersed weight in the form of a float member connected in a depending manner by a lever arm from said unitary formed shaft means, whereby a center of lift of said immersed float shifts in accordance with said front and back tilting of said attachment to help effect said respective clamping lever positions.

9. In combination with a magnetic compass assembly embodying a stationary reference member, a freely rotatable and slightly tiltable composite compass needle and compass rose card mounted on vertical pivot means provided generally centrally of said assembly and disposed within a transparent covered compass housing, the improvement comprising mechanical means for selectively and temporarily clamping said compass card in a fixed position relative to said pointer, mechanical means comprising weight means connected to one end of a bell-crank lever and in spaced relation to means forming a generally horizontally disposed pivot shaft for said lever whose pivot shaft axis constitutes a clamping axis and generally bisects said compass housing, said bell-crank lever further including a clamping arm projecting transversely from said pivot shaft axis and generally co-planar therewith for at least part of its length; said arm terminating remote from said pivot axis of said weighted lever in a free end portion adapted to clamp against a surface of said rotatable compass card after a sighting with said compass has been established, said weight activated bell-crank lever moving between card-release and peripheral card-clamping positions responsive to respective front and back tilting of said compass assembly and associated weighted lever means toward a sighted object whereby asid weight shifts front and back of said pivotal clamping axis to effect said respective clamping lever positions.

10. The combination as defined in claim **9**, wherein said bell-crank lever is disposed above said compass card and further such that said weight means is disposed above said pivot shaft, with a clamping pressure being applied to said card from above.

11. The combination as defined in claim **9** further including lever travel stop means, and wherein said bell-crank lever includes a further arm extending generally co-extensively from and as a continuation of the lever arm not having said weight means attached thereto, said latter and further arms constituting first and second arm portions, respectively, and being unitarily interjoined substantially at the clamping axis and each projecting to opposite sides of said clamping axis, whereby one of latter-mentioned arms terminates in a card-clamping end portion and the other terminates in a lever travel limiting end portion for engagement with said lever travel stop means, responsive to corresponding tilting movements of said compass assembly.

12. The combination as defined in claim **11** wherein said bell-crank lever is of bifurcated form throughout at least one arm thereof so as to straddle said vertical pivot means for the rotatable compass card.

13. The combination as defined in claim **11**, wherein said lever travel stop means includes a stop pin projecting above said compass card a predetermined distance and adjacent said stationary reference member; said bell-crank clamping lever, said stationary reference member and said compass card all relatively disposed so that responsive to tilting in the back direction said second arm portion of said lever applies downward pressure by its terminal end portion onto one peripheral side portion of said compass card thereby tilting said card on its vertical pivot means until a diametrical opposite peripheral side portion of said compass card is raised up into clamping engagement with said stop

pin disposed thereabove to facilitate the bearing reading by the adjacent reference member, and said first arm portion of said lever has its terminal end portion raised away from said stop pin during the aforesaid condition, and whereby said latter end portion rests upon the top of said stop pin when said clamping lever and compass assembly are tilted in the front direction thereby releasing said compass card.

14. The combination as defined in claim **9** further including casing-attached bracket means extending generally parallel to said clamping axis and of sufficient lateral extent to rest upon lens barrels of a pair of conventional binoculars with which said combination may be usefully associated.

15. The combination as defined in claim **9** wherein said magnetic compass assembly is further provided with tubular peep sight means having a viewing axis disposed transversely to said pivotal clamping lever axis, thereby facilitating use of the combination independently apart from use with a binoculars or like instrument.

* * * * *