No. 2313734

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Whereas CARL J. CRANE, of Shreveport, Louisiana, and SAMUEL M. BURKA, of Dayton, Ohio,

PRESENTED TO THE Commissioner of Patents A PETITION PRAYING FOR THE GRANT OF LETTERS PATENT FOR AN ALLEGED NEW AND USEFUL IMPROVEMENT IN

TEMPERATURE COMPENSATED BUBBLES FOR PANORAMIC SEXTANTS,

A DESCRIPTION OF WHICH INVENTION IS CONTAINED IN THE SPECIFICATION OF WHICH A COPY IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND COMPLIED WITH THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED, AND

Whereas UPON DUE EXAMINATION MADE THE SAID CLAIMANT s are ADJUDGED TO BE JUSTLY ENTITLED TO A PATENT UNDER THE LAW.

NOW THEREFORE THESE Letters Patent ARE TO GRANT UNTO THE SAID

Carl J. Crane and Samuel M. Burka, their heirs OR ASSIGNS

FOR THE TERM OF SEVENTEEN YEARS FROM THE DATE OF THIS GRANT

THE EXCLUSIVE RIGHT TO MAKE, USE AND VEND THE SAID INVENTION THROUGHOUT THE UNITED STATES AND THE TERRITORIES THEREOF. Provided, however, that the said invention may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

In testimony whereof I have hereunto set my hand, and caused the seal of the Patent Office to be affixed at the City of Washington this sixteenth day of March, in the year of our Lord one thousand nine hundred and forty-three, and of the Independence of the United States of America the one hundred and sixty-seventh.

Attest:

E. L. Reynolds
Law Examiner.

Conway P. Coe
Commissioner of Patents.

March 16, 1943. C. J. CRANE ET AL 2,313,734

TEMPERATURE COMPENSATED BUBBLE FOR PANORAMIC SEXTANT

Original Filed March 14, 1940

FIG. 1.

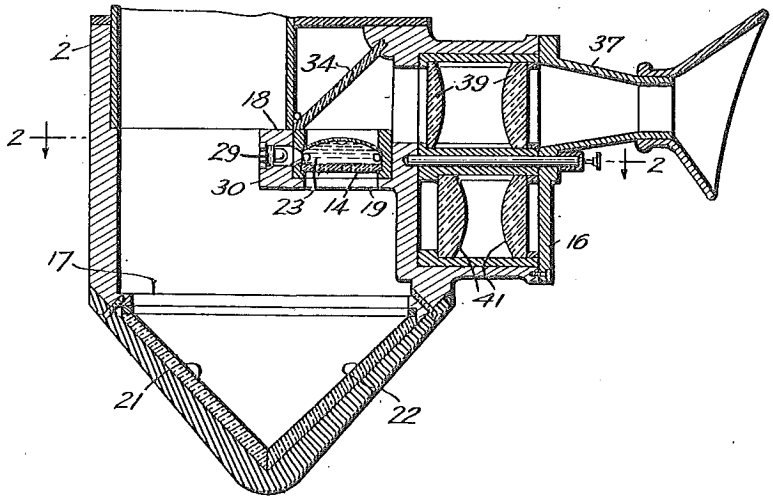


FIG. 2.

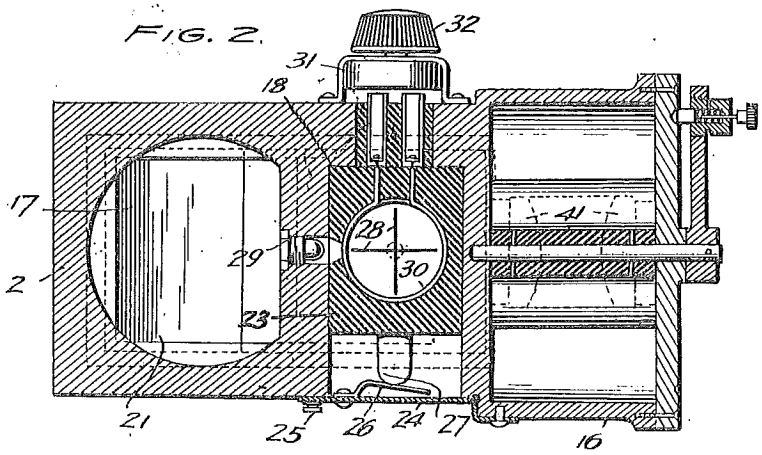
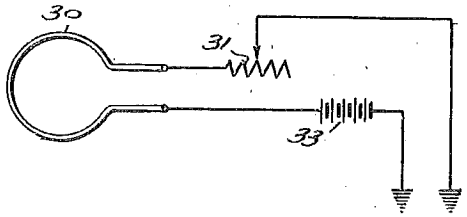


FIG. 3.



INVENTORS
CARL J. CRANE
SAMUEL M. BURKA
BY Edgar M. Spodgrass and
Wade Newby
ATTORNEYS

Patented Mar. 16, 1943

2,313,734

UNITED STATES PATENT OFFICE

2,313,734

TEMPERATURE COMPENSATED BUBBLE FOR PANORAMIC SEXTANTS

Carl J. Crane, Shreveport, La., and Samuel M. Burka, Dayton, Ohio

Original application March 14, 1940, Serial No. 323,964. Divided and this application June 19, 1941, Serial No. 398,844

2 Claims. (Cl. 33—211)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to us of any royalty thereon.

This application is a division of application Serial No. 323,964, filed March 14, 1940 now Patent No. 2,280,798 granted April 28, 1942.

This invention relates to fluid levels and particularly to bubble levels used in connection with instruments such as sextants and the like.

It is an object of this invention to provide means for controlling the size of the bubble in a fluid level.

It is another object of this invention to provide means for varying the size of a fluid level bubble at will.

It is a further object of this invention to provide temperature control means for controlling the size of the bubble and for varying its size at will.

Other objects and advantages of the invention will become apparent from the following detailed descriptions of the invention, reference being had to the accompanying drawing wherein:

Fig. 1 is a cross sectional view of the lower portion of a sextant incorporating the present invention;

Fig. 2 is a cross sectional view taken along the lines 2—2 of Fig. 1; and

Fig. 3 is a diagrammatic view of the bubble-cell heating circuit.

Referring to the drawing, the bubble-cell 23 received in chamber 18 is operatively positioned in the lower end of the sextant housing 2 in such a manner as to receive image-carrying light rays reflected by mirrors 21 and 22 in reflector chamber 17. These rays pass through orifice 19 and bubble 23 and are reflected by the inclined reflector 34 through lenses 39 so as to be observable in eye piece 37. The eye lens unites in the drum 16 incorporating the low power lens 39 and the high power lens 41 for observing the images of the observed objects and the bubble-cell is as described in the aforementioned application of which this is a division.

Coming now to the subject matter of the instant invention, bubble-cell 23 is of a conventional and well known construction in which the bubble moves on the under side of the spherical surface of the top cover glass. The fluid in the level is of any suitable substance. In view of the fact that substances suitable for bubble levels are subjected to expansion and contraction under varying temperature conditions, the bubble level is provided with a heating element 30, the temperature of which is controllable by a rheostat 31 adjustable by means of knob 32. Electrical energy for heating purposes may be supplied by a suitable source 33.

As described in the aforementioned application, the bubble-cell is provided with a cross mark 20 to be used for taking bearings; a light 29 for illumination of the bubble; a door 24 for the opening 18; a nut 25 for holding the door closed; a spring 26 carried by the door and adapted to engage a projection 17 in the bubble-cell 23 for positioning the same in the chamber 18.

It is obvious that various modifications can be made without departing from the spirit and scope of the present invention as pointed out in the appended claims.

We claim:

1. A bubble-cell having means by which the size of the bubble may be changed at will, said means comprising an electrical heating circuit including a heating element within the cell and a rheostat for controlling the temperature of the heating element.

2. A bubble-cell having in combination, top and bottom plates of glass between which the bubble is confined, a source of potential, a heating element between the said plates of glass and a rheostat for controlling the temperature of the heating element, said heating element and rheostat being connected in electrical circuit with said source of potential.

CARL J. CRANE.
SAMUEL M. BURKA.

HEADQUARTERS
346TH SUB-DEPOT
SMOKY HILL ARMY AIR FIELD
SALINA, KANSAS

March 27, 1943

SUBJECT: Patent No. 2,313,734
Temperature Compensated Bubbles
For Panoramic Sextants
Serial No. 396,844 (Div. of 323,964)

TO: Chief, Patent Liaison Branch
Office of the Judge Advocate
Materiel Center
Wright Field
Dayton, Ohio

1. Receipt is acknowledged of original United States Letters Patent, No. 2,313,734, issued March 16, 1943, for Temperature Compensated Bubbles and Panoramic Sextants. Receipt of same in duplicate, signed and dated, are enclosed.

CARL J. CRANE
Col., A.C.

1 Incl. - Receipt (in dup.)

HEADQUARTERS
346TH SUB-DEPOT
SMOKY HILL ARMY AIR FIELD
SALINA, KANSAS

March 27, 1943

SUBJECT: Patent No. 2,313,734
Temperature Compensated Bubbles
for Panoramic Sextants
Serial No. 308,844 (Div. of 323,964)

TO: Chief, Patent Liaison Branch
Office of the Judge Advocate
Materiel Center
Wright Field
Dayton, Ohio

1. Receipt is acknowledged of original United States Letters Patent, No. 2,313,734, issued March 16, 1943, for Temperature Compensated Bubbles and Panoramic Sextants. Receipt of same in duplicate, signed and dated, are enclosed.

CARL J. CRANE
Col., A.C.

1 Incl. - Receipt (in dup.)

AAFMC-265-WF-9-2-42-500M

INTER-OFFICE MEMORANDUM

ARMY AIR FORCES
MATERIEL CENTER
Office of The Commanding General

WRL:djp:17-1
Wright Field, Dayton, Ohio

Date March 23, 1943

TO: Colonel Carl J. Crane,
346 Sub Depot,
Smoky Hill Army Air Field,
Salina, Kansas.

SUBJECT: Patent No. 2,313,734 -
Temperature Compensated Bubbles
for Panoramic Sextants -
Serial No. 398,844 (Div. of 323,964)

Attached are original United States Letters Patent No. 2,313,734 issued March 16, 1943 for Temperature Compensated Bubbles for Panoramic Sextants and receipt in duplicate for same. It is requested that you date and sign both copies of the receipt and return them to this office as soon as possible.

Charles Stearns

CHARLES STEARNS,
Major, J. A. G. D.,
Chief, Patent Liaison Branch,
Office of the Judge Advocate.

Att:
Patent
Receipt (in dup.)

cc -
S.M. Burka
Equip. Lab.

Signature .....