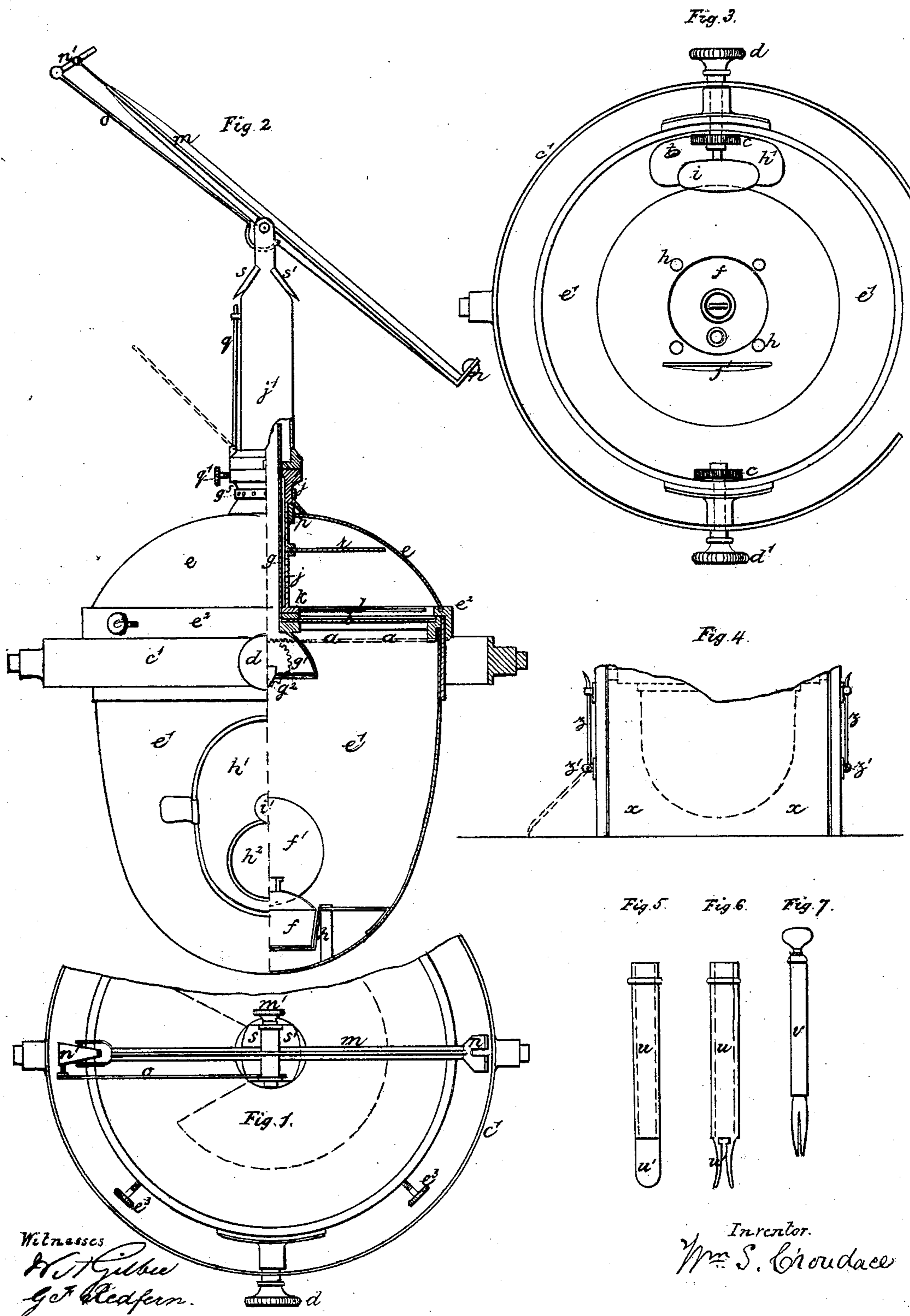


W. S. CROUDACE.  
Dumb Compasses.

No. 151,856.

Patented June 9, 1874.



Witnesses  
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# UNITED STATES PATENT OFFICE.

WILLIAM S. CROUDACE, OF DUNDEE, NORTH BRITAIN.

## IMPROVEMENT IN DUMB-COMPASSES.

Specification forming part of Letters Patent No. **151,856**, dated June 9, 1874; application filed February 12, 1874.

*To all whom it may concern:*

Be it known that I, WILLIAM STOREY CROUDACE, of Dundee, in the county of Forfar, North Britain, have invented a certain Improved Dumb-Compass, of which the following is a specification:

This invention consists in the construction of an improved dumb-compass, whereby bearings at sea of any celestial object or a light on the coast may be taken in a more ready, correct, and easy manner than heretofore.

In carrying out my invention I apply on the outer circumference of the compass-card a toothed wheel or rack, into which gear two pinion-wheels placed within the compass-bowl. The axles of these pinion-wheels pass through the necks of the gimbals supporting the compass, and have milled heads at their outer end. By turning these milled heads the compass-card can be turned in a steady and uniform manner without disturbing the perpendicularity of the compass; and this arrangement allows of the compass-card being inclosed under a glass cover or dome to protect it from the effect of rain or spray.

In the bowl of the compass I place a lamp for illuminating the compass-card, which I make of frosted glass, thus enabling observations to be taken and read off during the night without the aid of an outside lamp. The heated air and products of combustion from the lamp are carried off through a chimney, the base of which is fitted to the center of the compass-card. The chimney is provided with a ventilating-ring, or diagonal holes are employed. Tubes are fitted into the bottom of the compass-bowl for the supply of air to the lamp. In the door of the compass-bowl is a circular plate of glass provided with a movable screen. Over the chimney on the compass-card I fit a hollow standard, to which is hinged a movable style, whereby the azimuth of the sun may be observed at any altitude. The indicator is fitted, by means of a collar provided with set-screws, to the base of the hollow standard, and the pointer is fixed on a joint at the top of the standard above the chimney, and is provided at its outer end with a triangular mirror.

To make the invention better understood,

I will proceed to describe the same by reference to the accompanying drawing, in which—

Figure 1 is a part plan, and Fig. 2 an elevation, half in section, of my improved dumb-compass detached from its box; Fig. 3, plan of the interior of the compass-bowl, the back of the compass being placed toward the front; Fig. 4, part elevation of the compass-box; and Figs. 5, 6, and 7, views of the apparatus for lighting the lamp. Figs. 1, 2, and 3 are drawn to a scale of about one-third full size; Fig. 4, about one-sixth full size.

Similar letters in all the figures represent similar parts.

*a a* is the toothed wheel or rack on the compass-card *b*, gearing into the pinion-wheels *c c*. *d d'* are the milled heads, placed outside the gimbal-ring *c'*, and at the outer ends of the axles of the wheels *c c*. *e e* is the glass dome or cover fitted into the bezel *e'*, fixed to the compass-bowl by the screws *e''*. *f* is the lamp placed inside the compass-bowl *c'*; *f'*, reflector; *g*, chimney, fitted to the center, of the compass-card *b*; *g'*, uptake of the chimney, having a conical guard, *g''*, in the center, to prevent the lamp being blown out by a draft; *g'''*, ventilating-ring of chimney. In lieu of a ring, diagonal holes may be employed. *h h* are the air-tubes in the bottom of the compass-bowl; *h'*, door of compass-bowl, having a circular plate of glass, *h''*; *i*, movable screen for covering or uncovering the glass *h''*, as required; *i'*, knob for moving the screen. *j j'* is the hollow standard formed in two parts, the upper part *j'* fitting onto the lower part *j* by means of pins and sockets. The lower part *j* of the hollow standard passes through the glass dome *e*, and is provided at this part with the india-rubber band or collar *p*. To the collar *k*, at the base of the lower part *j* of the movable standard, is fitted, by means of set-screws, the indicator *l*. *m* is the pointer fixed on a joint at the top of the upper part *j'* of the standard. The pointer may be made telescopic to allow of increasing its length. *m'*, screw for fixing the pointer when set; *n*, spherical lens at the inner end of the pointer. *n'* is the triangular mirror, jointed, as shown, to the outer end of the pointer; *o*, guide or incidence bar, jointed at one end to

the lower part of the mirror, and at the other end to the standard  $j'$ . This mirror collects the rays of light from the lamp at whatever angle the pointer may be placed, and throws the light along the entire length of the pointer, thus enabling the sight of the eye to be directed truly along the bar of the pointer in the darkest night.  $q$  is the style, hinged to the base of the upper part  $j'$  of the hollow standard for obtaining the sun's azimuth at any altitude;  $q'$ , pinching-screw on collar of standard to fix the standard when in position;  $r$ , card-screen inside the dome, moving with the standard, and serving to prevent the light dazzling the eyes. This screen is cut away at that part which would be above the indicator, as shown in Fig. 1, where a plan of the screen is shown in dotted lines, to allow of reading off the bearing from the compass-card below. I prefer that the glass dome should be painted of a dark color all round up to the level of this screen, or the lower part of the dome may be made of metal.  $s s'$ , chimney-guards on top of standard;  $t$ , hole in the door of the compass-bowl (closed by a stopper or plug) for the introduction of the apparatus for lighting the lamp;  $y$ , gimbal-ring of the compass-bowl. The front  $x$  of the wooden box in which the compass is suspended is hinged at and to the bottom of the box, so that it may be let down, and air-holes are made round the sides and back of the box. On each side of the box I provide two claws,  $z z$ , hinged to the sides of the box at  $z'$ . When the compass is placed on deck, these claws are turned down, and their ends, catching into the deck, will hold the box and compass, and prevent it being moved from its place by a sudden roll of the ship.

I will now describe the method of using my improved compass for observing the bearing of a star—that is to say, place the compass with the lubber's-point in a line with the ship's keel. Take out the bearing of the star from the star azimuth-tables corresponding to the latitude and the apparent time at ship on the particular date. Slacken the pinching-screw  $q'$ , and turn the standard round with the finger and thumb until the indicator  $l$  over the compass-card  $b$  coincides with the given bearing. Tighten the pinching-screw  $q'$  to keep the indicator  $l$  over the bearing; then, with one hand on each of the milled heads  $d d'$ , turn them (and thereby the compass-card  $b$ ) until the star comes in a line with the pointer  $m$ . The compass-card  $b$  will then show the true direction of the ship's head, the lamp  $f$  in the compass-bowl illuminating the dial and allowing the bearing to be read off on the darkest night without necessitating the aid of an outside lamp. By raising the screen  $i$  by turning its knob  $i'$ , the lamp  $f$  will also give sufficient light through the glass plate  $h^2$  to allow of taking out the bearings from the azimuth-tables without dazzling the eyes.

To observe the bearing of the sun, place the compass with the lubber's-point in a line with the ship's keel. Take out the bearing from the sun's azimuth-tables, and turn the standard, as before described, until the indicator  $l$  coincides with the given bearing. Tighten the pinching-screw  $q'$ , and turn down the style  $q$  onto the glass dome or cover  $e$ , (if the sun's altitude be high,) and then turn round the compass-card by the milled heads  $d d'$  until the shadow from the style  $q$  corresponds with a vertical line marked on the lower part  $j$  of the standard. The compass-card will then show the true direction of the ship's head. If the sun's altitude be low, the style  $q$  should be placed at an angle of about forty-five degrees, as shown in dotted lines, Fig. 2, so that the shadow will fall on a vertical line on the upper part  $j'$  of the standard.

To observe the bearing of the land or a light, the lubber's-point must be placed in a line with the ship's keel, and the compass-card turned to the true direction of the ship's head. Slacken the pinching-screw  $q'$ , and turn round the standard  $j j'$  until the pointer  $m$  is in a line with the cape or other point of land, or with the light, and the indicator  $l$  over the compass-card  $b$  will then show the true bearing of the object.

What I claim is—

1. The improved dumb-compass, having a translucent compass-card,  $b$ , adjustable by a toothed wheel or rack,  $a$ , and pinions  $c c$ , and illuminated by a lamp,  $f$ , placed inside the compass-bowl, and a chimney,  $g$ , employed alone or in combination with the hollow standard  $j j'$ , carrying at its lower end the indicator  $l$ , and at its upper end the pointer  $m$ , the whole being arranged and acting substantially as described.

2. The toothed wheel or circular rack  $a$  and pinion  $c$  on the end of shaft, passing through the hollow gimbal-pivot  $c^2$ , with milled knobs  $d d'$  applied to dumb-compasses, for moving the compass-card without disturbing the perpendicularity of the compass, substantially as described.

3. The hollow standard  $j j'$ , carrying the indicator  $l$  at the lower end, and at the upper end the pointer  $m$ , having spherical lens  $n$ , mirror  $n'$ , and guide  $o$ , when used in combination with a dumb-compass having an illuminated compass-card, substantially as described.

4. The movable style  $q$ , hinged to the hollow standard for taking the azimuth of the sun at any altitude, as hereinbefore described.

In testimony whereof I have hereunto set my hand and affixed my seal this eighth day of April, one thousand eight hundred and seventy-three.

WM. S. CROUDACE. [L. S.]

Witnesses:

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