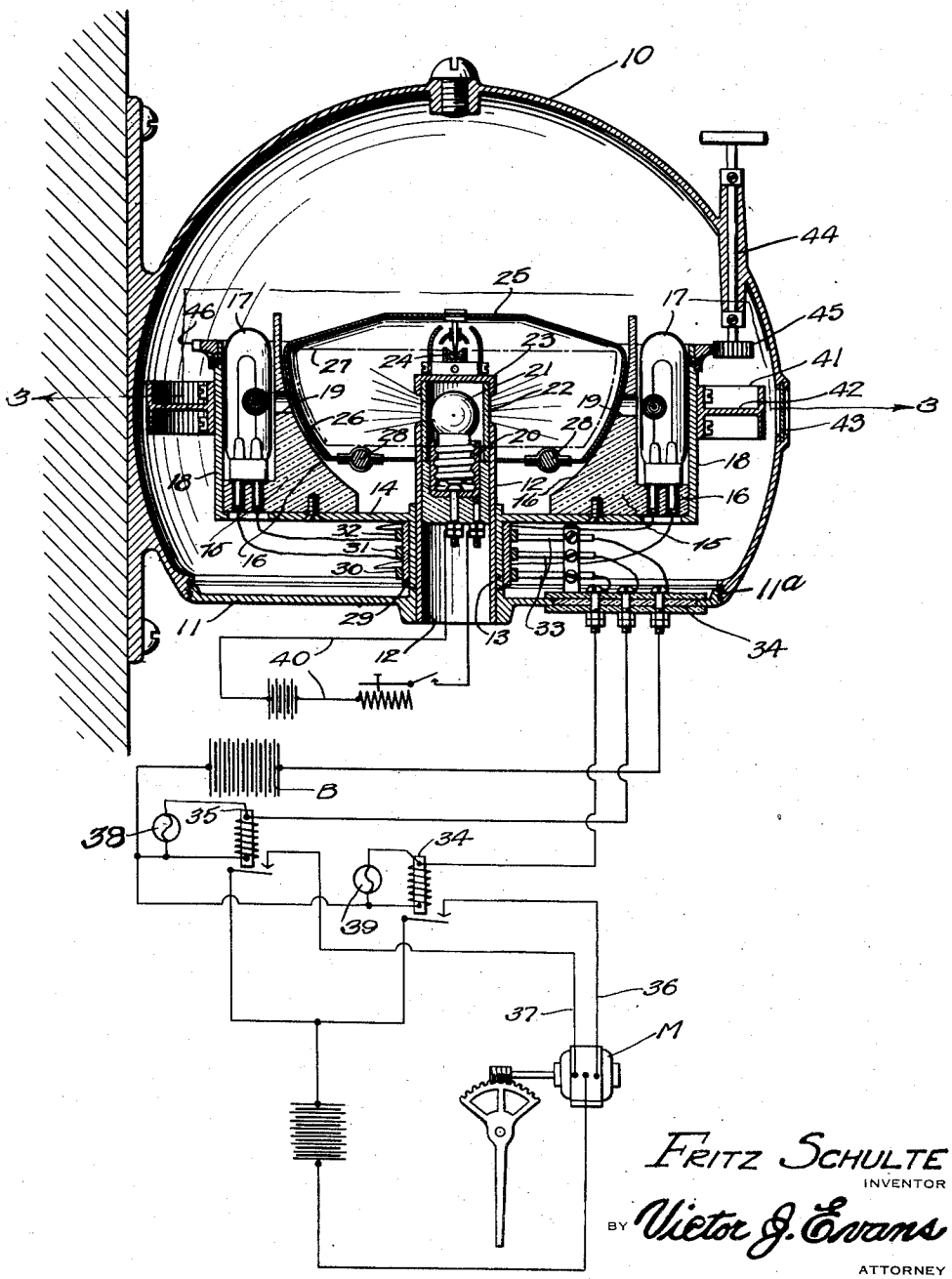
Oct. 3, 1933. F. SCHULTE 1,929,400

LIGHT RELAY COMPASS FOR DIRECTION AND INDICATION

Filed Dec. 6, 1929 3 Sheets-Sheet 1

Fig. 1.



FRITZ SCHULTE
INVENTOR

BY Victor J. Evans
ATTORNEY

Oct. 3, 1933. F. SCHULTE 1,929,400

LIGHT RELAY COMPASS FOR DIRECTION AND INDICATION

Filed Dec. 6, 1929 3 Sheets-Sheet 2

Fig. 2.

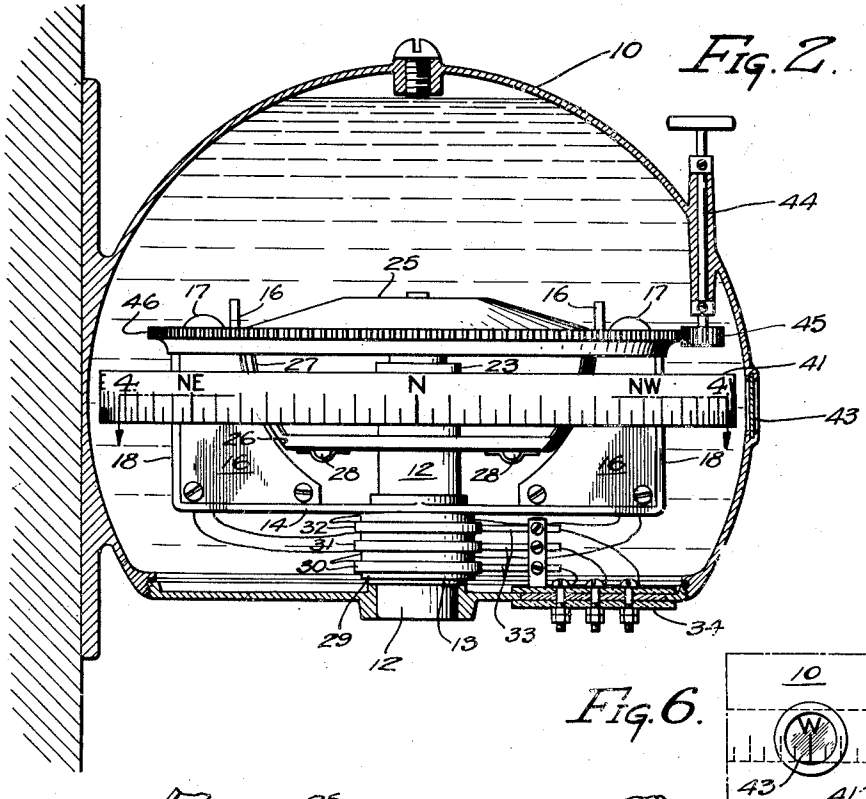


Fig. 6.

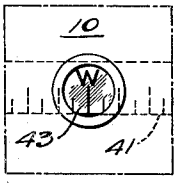
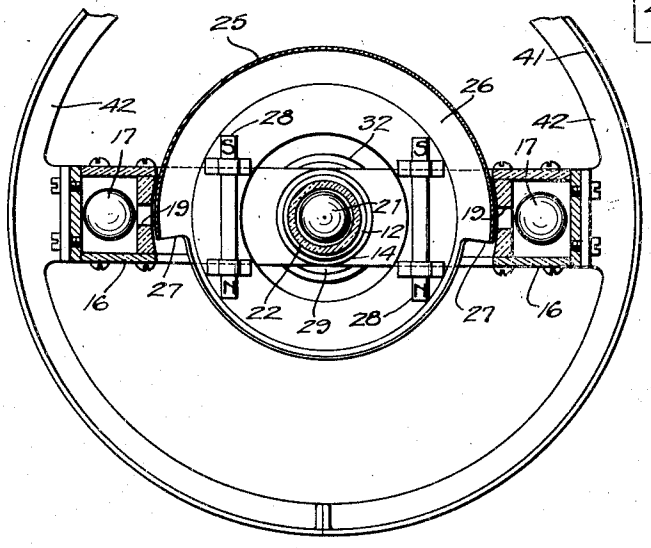


Fig. 4.



FRITZ SCHULTE
INVENTOR

BY Victor J. Evans
ATTORNEY

Oct. 3, 1933. F. SCHULTE 1,929,400

LIGHT RELAY COMPASS FOR DIRECTION AND INDICATION

Filed Dec. 6, 1929 3 Sheets-Sheet 3

Fig. 3.

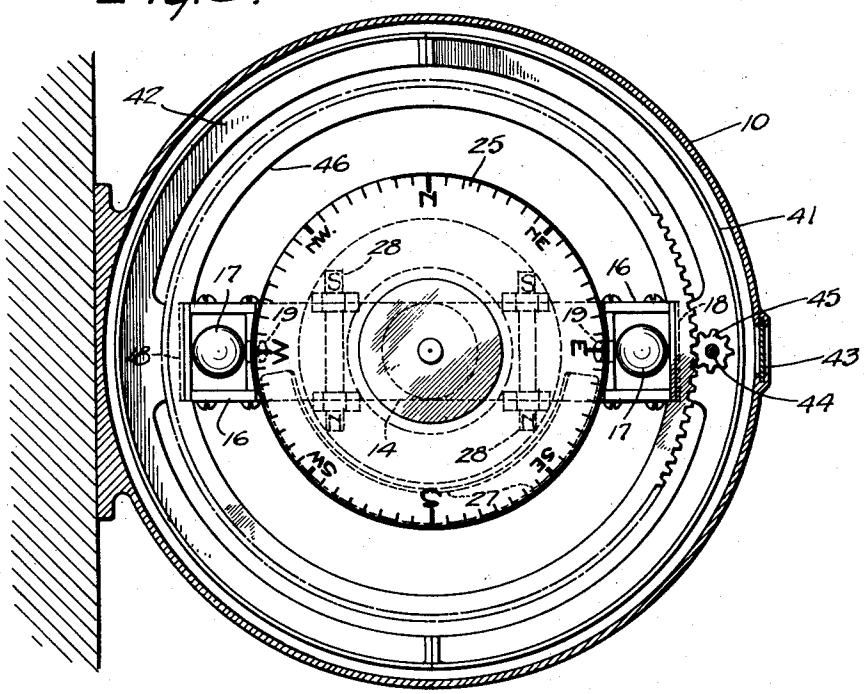
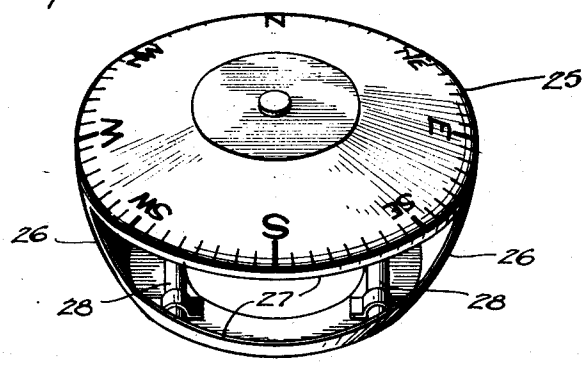


Fig. 5.



FRITZ SCHULTE
INVENTOR

BY Victor J. Evans
ATTORNEY

Patented Oct. 3, 1933

1,929,400

UNITED STATES PATENT OFFICE

1,929,400

LIGHT RELAY COMPASS FOR DIRECTION AND INDICATION

Fritz Schulte, Philadelphia, Pa.

Application December 6, 1929. Serial No. 412,203

3 Claims. (Cl. 33—204)

This invention relates to control compasses for automatic steering mechanisms, and more particularly to the construction of a compass whereby the operation of a motor on a vehicle may be automatically controlled to correct or prevent deviation from a previously determined course.

A further and more specific object of the invention is the provision of a compass wherein a previously determined course may be set and in which movements of the compass card with relation to a surrounding annular closure effects either of two electrical circuits, depending upon the direction of deviation.

A further and more specific object of the invention is to provide a compass of this character employing selenium cells as an actuating means.

A still further object of the invention is the provision of a compass of this character which may be practically employed, which will be durable and effective in service, and which may be economically manufactured.

It is to be understood that the particulars herein given are in no way limitative, and that while still keeping within the scope of the invention, any desired modification of details and proportions may be made in the construction of the appliance according to circumstances.

The invention comprises further features and combination of parts to be hereinafter set forth, shown in the drawings and claimed.

In the drawings:

Figure 1 is a vertical sectional view through the improved light relay compass for direction and indication, showing the necessary circuits in diagram.

Figure 2 is a vertical sectional view through the compass but showing certain features in elevation.

Figure 3 is a sectional view on line 3—3 of Figure 1.

Figure 4 is a sectional view on line 4—4 of Figure 2.

Figure 5 is a detailed perspective view of the compass card.

Figure 6 is a detailed view in elevation of the window light 43 in the compass bowl.

Referring now more particularly to the drawings, the numeral 10 generally designates a compass bowl at present shown as globular and having a flattened base 11, which is secured to the compass bowl by threads at 11*a*. Rising from the base within the bowl is a tubular standard 12 rotatably embraced adjacent its lower end by a flange 13 defining a central opening in the base of a support 14.

This support comprises a transverse strap which depends from a gear 46 and supports porcelain shield pieces 15, which are curved at 16 to define a partial spherical socket. At spaced points selenium cells 17 are arranged in and carried by the porcelain pieces, as not only shown in Figure 1 but also in Figure 2 as well as Figure 4. The outer wall 18 of the support 14 depends from the gear 46, while the porcelain pieces 15 have openings 19, which are in alignment with the selenium cells.

Within the tubular standard 12 adjacent the upper end thereof is arranged a socket 20 for an illuminating element 21, this element having its filament disposed above the upper end of the standard and surrounded by a transparent casing 22. Upon a cap 23 for the transparent casing is arranged a bearing pivot 24 for a compass card 25. The compass card 25 has at its perimeter a depending flange 26, which flange is arcuately curved with the pivot 24 as a center and has formed therein an opening 27 extending through an angle slightly less than the distance between the openings 19.

The lower edge of this flange has connected thereto magnets 28 controlling the operation of the compass.

Surrounding the flange 13 is an insulating band 29 bearing collector rings 30, 31 and 32, which co-act with brushes 33 mounted upon an insulating insert 34 carried by the base 11. The ring 32 through its brush 33 is connected to one terminal of a source of current B while each of the collectors 30 and 31 is connected with one terminal of a relay 34 and 35, the remaining terminals of these relays being connected to the second terminal of the battery. The relay switches 34 and 35 close reversely connecting operating circuits 36 and 37 of a steering motor M.

Instead of the steering motor M the circuits 36 and 37 may control signal lights 38 and 39, or as at present illustrated both the signal lights and motor may be controlled.

It will be obvious that by fixing a compass of this character to a dirigible vessel and supplying the necessary lighting circuit 40 for illuminating element 21, whenever deviation of the vessel from a pre-determined course occurs, the opening 27 of the compass card flange will permit rays from the lamp 21 to pass through an opening 19 and fall upon the associated selenium cell. The current ordinarily passed by these cells will be insufficient for operations of the relays 34 and 35, but in accordance with the well known property of such cells, when a light ray is imposed thereon

the flow of current through the circuit increases and the associated relay is operated, closing the circuit of the motor signal light or both.

When the circuit of the steering motor M is closed the action will of course be that of shifting the steering mechanism to restore the vessel to its selected course, and as soon as the vessel resumes the course the flange of the compass card will cut off the light rays and thereby stop operation of the motor. In order that the course may be conveniently selected there is provided upon the support 14, an annular flange 41, at present shown as spaced from the side walls of the support through an outstanding rib 42. The outer face of the flange 41 which confronts a sight opening 43 in the wall of the compass bowl will be provided with a suitable compass index as shown.

Since the compass card will remain stationary at all times all that is necessary to bring a vessel on a pre-determined course is to rotate the support 14 until the desired course appears in the sight opening. Rotation of the support is obtained through a shaft 44 rotatably directed through the compass bowl wall and having at its end a pinion 45 meshing with a ring gear 46 formed upon the support.

I claim:

1. In a compass of the type described, a standard, an illuminating element carried by the standard, a compass card carried by the standard and having a depending flange surrounding the illuminating element, said flange having an opening formed therein, a support rotatably surrounding the standard and in surrounding relation to the flange of the compass card, selenium cells carried by said support, shields on said support interposed between each cell and the flange of the compass card, said shields having openings aligned with the cells and the illuminating element, means for rotating said support, and circuits for said cells constructed and arranged so that a signalling element may be rendered operable, an index upon the rotatable support, and a bowl surrounding the card and index, said bowl having a sight opening thru which the index is visible.

2. In a compass of the type described, a standard, a pivot bearing carried by the standard, a compass card mounted on the bearing, a support rotatable about the standard as a center, light responsive resistances carried by said rotatable support, shields on said support and interposed between the compass card and each resistance, and having openings aligned with the resistances and the standard, an illuminating element carried by the standard axially thereof and a flange on the compass card extending between the illuminating element and the resistances and having an opening formed therein of a length slightly less than the distance between the openings of said shields, said flange being arcuately curved with the pivot as of center, an annular compass index carried by the exterior of the rotatable support, a bowl surrounding the rotatable support having an opening aligned with said index, and means extending through the wall of the bowl for rotating the rotatable support and index.

3. In a compass of the type described, a standard comprising a transparent casing, an illuminating element disposed therein, a pivot coaxial with the standard, magnetic directional element oscillatably and rotatably mounted upon said pivot and having a wall surrounding the illuminating element, said wall being cut away through approximately one half its circumference, diametrically opposed light responsive resistances rotatable about the standard, a shield associated with each resistance and having an opening in alignment with the illuminating element and resistance, a bowl surrounding the aforenamed elements, a rotatably mounted index, and means for synchronously rotating said resistances and said index.

FRITZ SCHULTE.