F. W. WOOD.

CONTACT MAKER FOR HELM INDICATORS.

APPLICATION FILED DEC. 19, 1907.

914,626. **Patented Mar. 9, 1909.**

3 SHEETS—SHEET 1.

Fig. 1.

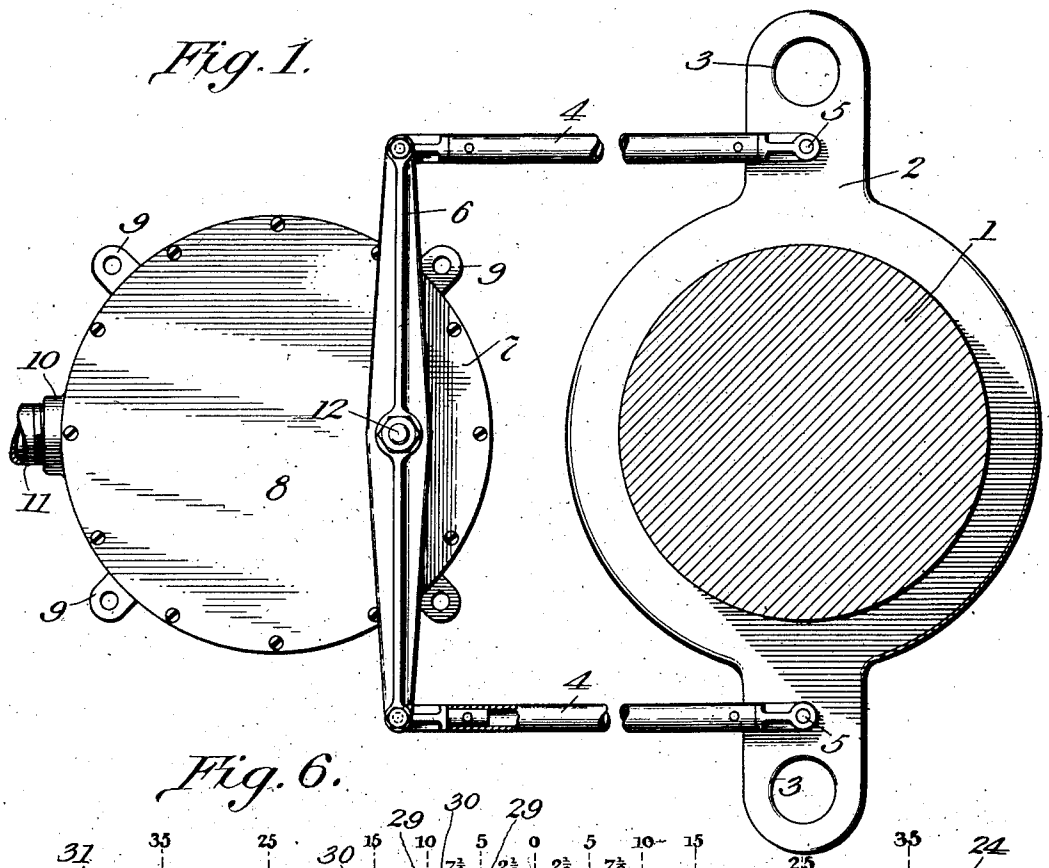
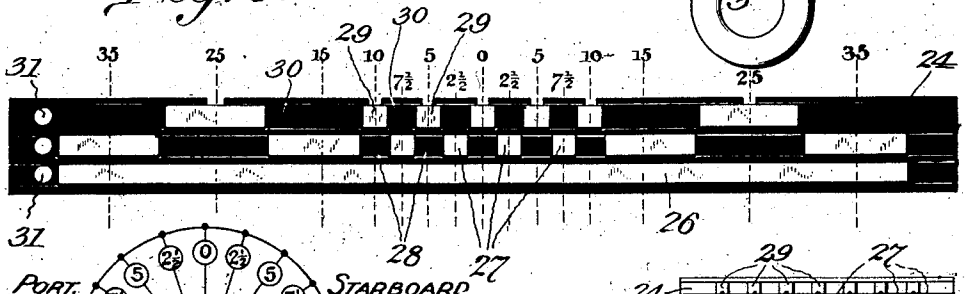


Fig. 6.



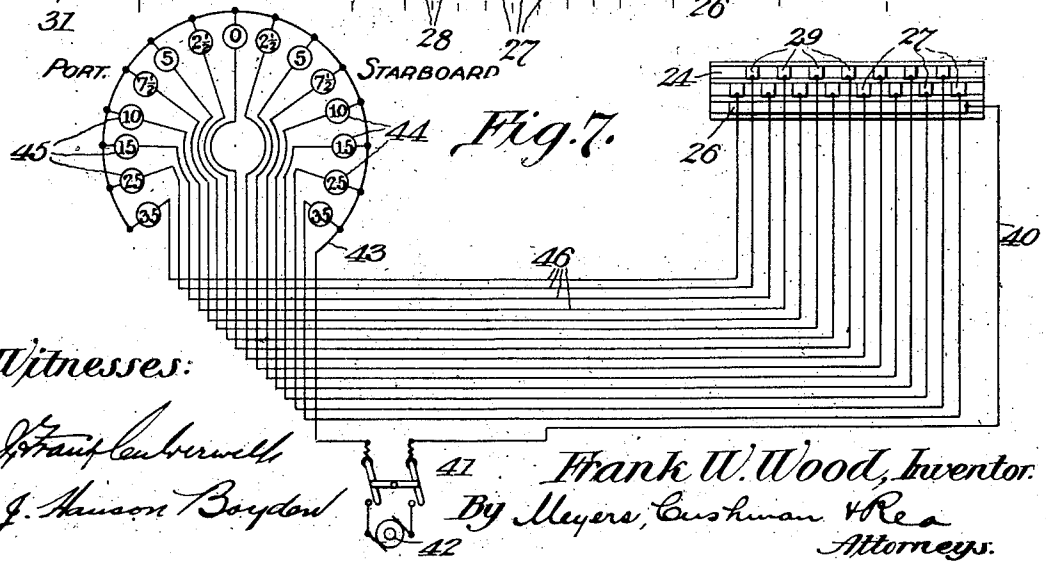


Fig. 7.

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3 SHEETS—SHEET 2.

Fig. 2.

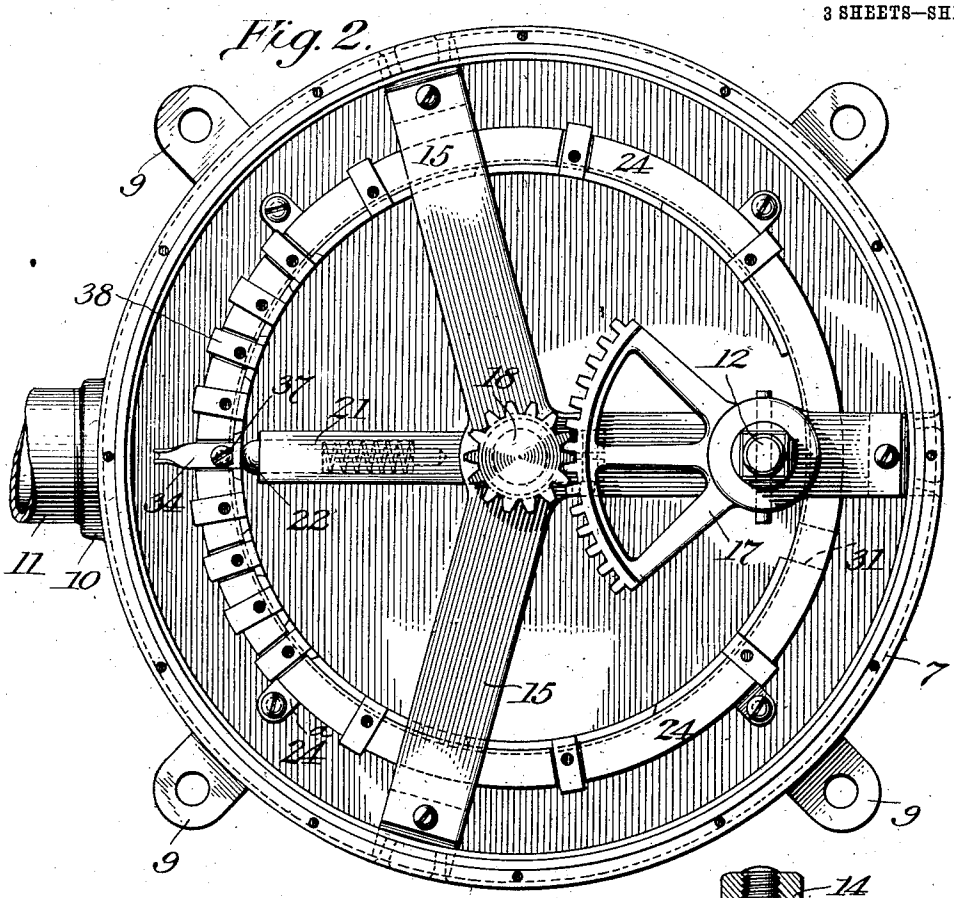
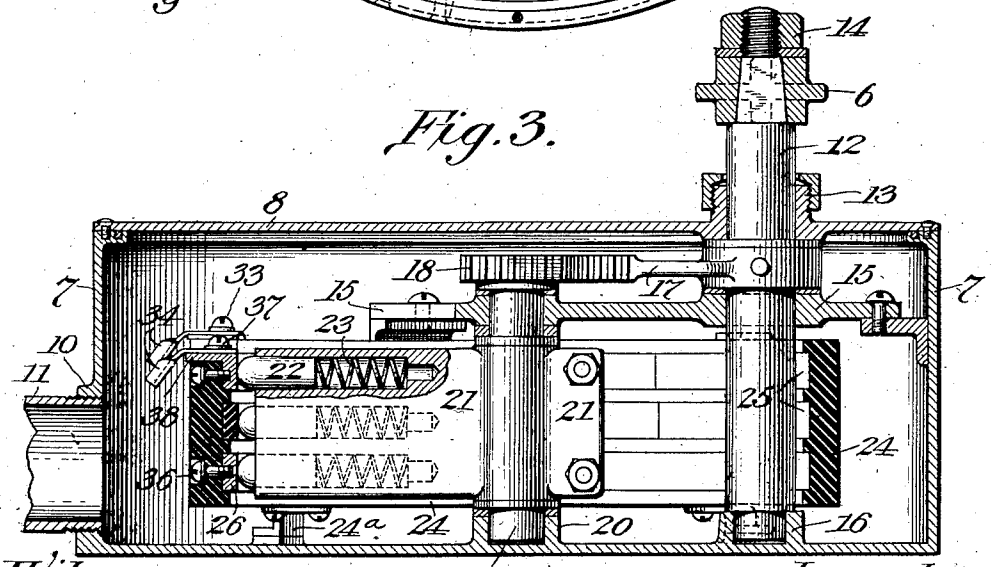


Fig. 3.



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3 SHEETS—SHEET 3.

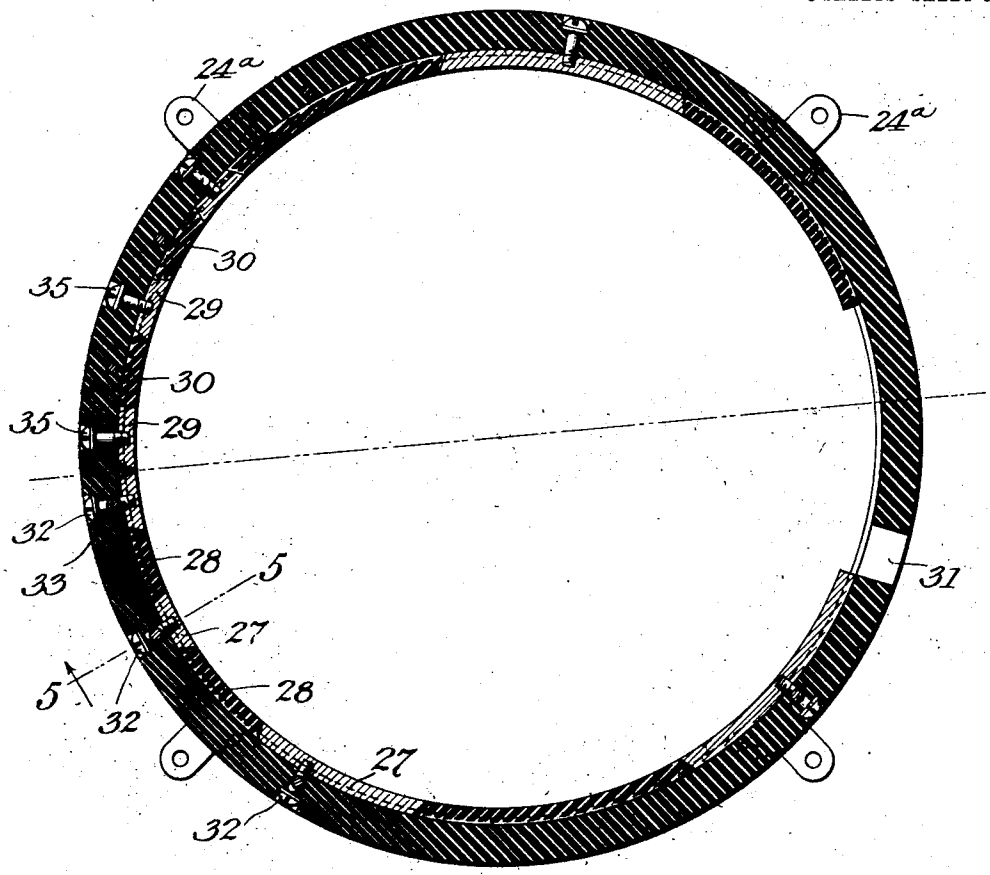


Fig. 4.

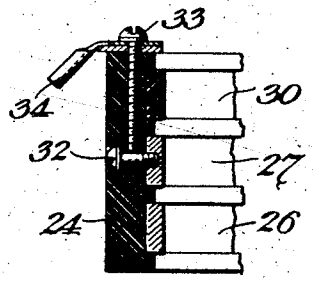


Fig. 5.

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UNITED STATES PATENT OFFICE.

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CONTACT-MAKER FOR HELM-INDICATORS.

No. 914,626. Specification of Letters Patent. Patented March 9, 1909.

Application filed December 19, 1907. Serial No. 407,163.

To all whom it may concern:

Be it known that I, FRANK W. WOOD, a citizen of the United States, residing at Newport News, in the county of Warwick and State of Virginia, have invented new and useful Improvements in Contact-Makers for Helm-Indicators, of which the following is a specification.

This invention relates to helm indicators and particularly to devices of this character in which a suitable electric indicating instrument placed on the bridge, in the steering engine room, or other suitable place on board the ship, is so arranged as to indicate accurately at all times the angular position of the helm or the rudder.

The primary object of the invention is to provide a device of this character in which arcing at the contact points will be practically avoided and the consequent destruction of the parts prevented.

Another object of the invention is to provide a contact maker in which the movement of the contact arm will be relatively large in proportion to the movement of the rudder post.

Another object of the invention is to provide a device of this character which may be located in exposed places without fear of the contact mechanism being injured by dust, water or the like.

With the above and other objects in view, and to improve generally upon the details of construction of devices of this character, the invention consists in the construction and arrangement of parts hereinafter described, and illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of my complete device, showing the same connected to the rudder post. Fig. 2 is a plan view, on an enlarged scale, of the contact box, with the cover removed. Fig. 3 is a substantially central, transverse section thereof, parts being shown in elevation. Fig. 4 is a horizontal section of the contact ring or drum, on an enlarged scale, the parts above and below the broken line lying in different planes. Fig. 5 is a detail sectional view on the line 5—5 of Fig. 4. Fig. 6 is a development of the contact drum. Fig. 7 is a diagram illustrating the circuits employed.

Referring to the drawings in detail, 1 represents the usual rudder post, to which I attach a yoke 2 provided with openings 3 for the reception of the usual steering gear connections. To this yoke 2, I pivot on either side of the post, as at 5, one end of a pair of links 4, the other ends of which are connected to the ends of a cross bar 6, associated with the contact box. As clearly shown in Fig. 3, this cross bar 6 is mounted on the square upper end of a shaft 12, and held in position by means of a lock nut 14. The shaft 12 passes through the stuffing box 13 formed in the top, 8, of a casing 7, inclosing the operating parts of the contact maker. The casing is provided with perforated lugs 9, by means of which it may be secured in position, and with a screw-threaded socket 10, into which fits a pipe 11, which constitutes a conduit for the wires forming the various circuits. The shaft 12 passes to the inside of the casing and is journaled in a bracket 15 and, at its lower end, in a socket 16, formed on the bottom of the casing. To the shaft 12 is secured a segmental rack or gear 17, which meshes with a pinion 18 carried on the upper end of a shaft 19, which is also journaled in the bracket 15, and in a socket 20 formed in the bottom of the casing. To the shaft 19 is secured a contact arm 21, provided at its outer end with a plurality of sockets, in which are mounted pencils or brushes 22, preferably of carbon, behind which are placed the coil springs 23.

Mounted concentrically of the casing 7 and supported slightly above the bottom thereof by means of brackets 24^a, is an annular ring or drum 24, formed of insulating material, such as hard rubber or the like. As clearly shown in Fig. 3, this drum is provided on its inner surface with a plurality of grooves 25, and in these grooves are arranged the contact strips which coöperate with the brushes, 22, to control the circuits hereinafter described. In the lower one of the three grooves is mounted a continuous metallic strip or band 26, secured in position by means of screws 36 passing through the body of the drum. In the middle groove is secured a series of metallic strips or contacts 27, separated by intervening pieces 28, of insulating material. In the top groove is secured a series of metallic strips or contacts 29, separated by intervening pieces of insulating material 30. These contacts are held in position by screws 32, 35, passing through the body of the drum, and, as will be seen, by reference to Fig. 4,

the ends of the contact strips 27 and 29 are arranged to overlie the ends of the intervening pieces of insulating material 28 and 30, and thus hold the latter in position. In Fig. 4, the lower half is a section through the middle series of contacts 27, while the upper half is a section through the top row of contacts 29. The contacts of the upper row are provided with projecting lugs 38, to which wire terminals such as 34 may be secured by means of screws 37. Connections are made with the contacts of the middle series by means of screws 33, passing downwardly through wire terminals 34, and contacting with screws 32 which hold the contacts 27 in place. As shown in Figs. 3 and 6, the terminals for the upper series of contacts are located in notches formed in the edge of the drum, and thus lie in a lower plane than the terminals for the middle series, which are secured to the edge of the drum. By reference to Fig. 6 it will be seen that the contacts 29 of the upper series, alternate with the contacts 27 of the middle series. In other words, vertical lines drawn through the contacts of the upper series will pass through the pieces of insulation, separating the contacts of the middle series. The brushes 22 are arranged to bear, one upon each annular series of contacts, and the drum 24 is provided with a set of openings 31, through which the brushes 22 may be inserted in or removed from the contact arm 21.

Fig. 7 shows a system of wiring which may be employed with my improved contact mechanism. By reference to this figure, it will be seen that I have illustrated an indicator which consists of a set of electric lamps 44, 45, arranged preferably in the arc of a circle, and adapted to be disposed within a casing provided with partitions having transparent front walls bearing numbers indicating the degrees of displacement of the rudder. Associated with the numbers may be the legends, "Port", "Starboard". Such an indicator is shown and described in my Patent, No. 667,859, granted February 12, 1901, and forms no part of the present invention. It will be particularly noted, however, that consecutive lamps, such as 44, are wired by means of the leads 46 to alternate contact pieces of my contact mechanism. That is to say, adjacent lamps are wired alternately to the contacts 29 of the top row and the contacts 27 of the middle row. The contact 26 constitutes a common return, and is connected by means of a wire 40, through a suitable switch 41, and source of current 42, with a wire 43 which is common to all of the lamps.

It will be seen that by the above arrangement I am enabled to separate each of the contacts by a comparatively large piece of insulating material, without unduly increasing the size of the apparatus. Since the brushes have a comparatively small contact surface, it will be obvious that it is impossible for them to bridge the space between any two contacts, such as 29, and thus cause objectionable mistakes. Also, owing to the great width of insulation between the contacts it will be impossible for an arc to form from one to the other. The arrangement has a number of advantages which, it is thought, are not necessary to dwell upon at length, as they are obvious, and will be readily appreciated by those skilled in the art.

By means of the gearing 17, 18, I am enabled to produce a large movement of the contact arm 21 by a comparatively small movement by the rudder post 1. The construction shown in Figs. 1, 2 and 3 also permits of the contact mechanism being entirely inclosed in a water-proof casing, and located at any desirable or convenient point.

What I claim is:

1. A contact making device for helm indicators comprising a contact drum, a contact arm associated therewith, a shaft on which said arm is mounted, a second shaft, intermeshing gears carried by said two shafts, a cross-bar also carried by said second shaft, an oscillatory post, and connections between said post and cross-bar.

2. In a contact maker for helm indicators, an annular ring or drum, a series of contacts carried on the inner face thereof, and a contact arm mounted on an axis concentric with said ring, and provided at its end with a contact brush coöperating with said series of contacts, said ring or drum being formed with an opening through which said brush may be inserted in or removed from said arm.

3. In a contact maker for helm indicators, a support, a plurality of annular series of contacts carried on one face thereof, and a contact arm carrying at its end a plurality of removable, spring pressed brushes coöperating with said series of contacts, said support being provided with a plurality of openings, one for each series of contacts, through which said brushes may be inserted in or removed from said arm.

4. In a contact maker for helm indicators, a contact arm, and an annular ring of insulating material surrounding the same, and carrying on its inner face an annular series of contacts, separated by pieces of insulating material, said contacts being secured to said ring by fastening means, and being so shaped as to overlie the ends of said pieces of insulating material, and hold them in position.

5. In a contact maker for helm indicators, a contact arm, and an annular ring of insulating material surrounding the same, said ring having formed on its inner face a series of annular grooves, each of said grooves having mounted therein a series of metallic con-

tacts separated by pieces of insulating material, each metallic contact being secured to said ring by a suitable fastening means, and being so shaped at its end as to overlie the end of the adjacent piece of insulating material, and hold it in position.

6. In a helm angle indicator, a contact maker comprising a pair of adjacent annular series of contacts, the contacts of one of said series alternating with those of the other, and an indicator comprising a series of translating devices, consecutive ones of which are connected alternately to contacts of each series.

7. In a helm angle indicator, the combination of a transmitting and a receiving instrument, said transmitting instrument comprising a contact brush and a plurality of series of contacts over which said brush is adapted to move, and said receiving instrument comprising a single series of translating devices, consecutive ones of which are connected to contacts of different series, whereby arcing at the contacts is prevented.

8. In a helm angle indicator, the combination of a transmitting and a receiving instrument, said transmitting instrument comprising a pair of annular parallel series of contacts, and a pair of connected brushes adapted to move thereover, and said receiving instrument comprising a single annular series of translating devices, consecutive ones of which are connected alternately to contacts of each of said series, whereby arcing is prevented, and the apparatus rendered more compact.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANK W. WOOD.

Witnesses:
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