

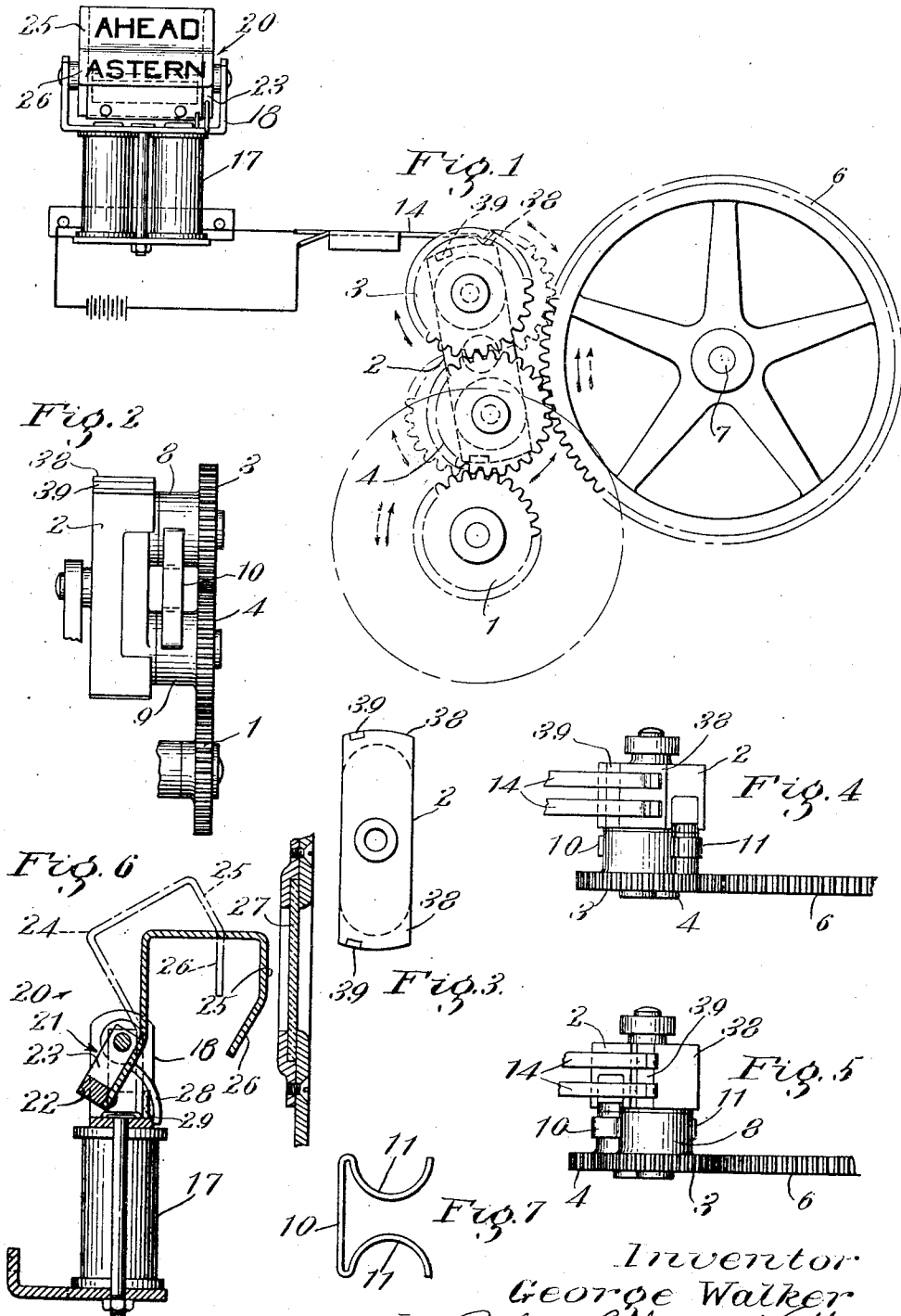
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G. WALKER

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UNIDIRECTIONAL DRIVING MECHANISM

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Inventor
 George Walker
 by Roberts Cushman & Woodberry,
 Att'ys.

UNITED STATES PATENT OFFICE

GEORGE WALKER, OF NEWTON CENTER, MASSACHUSETTS

UNIDIRECTIONAL DRIVING MECHANISM

Application filed March 1, 1928. Serial No. 91,360.

This invention relates to mechanism designed to be incorporated in a recording device whereby the latter may be equally responsive to movement of a given member in either direction, and in its more specific aspect is intended to be used in ship's instruments of the type which form the subject-matter of the copending application of George Walker, Serial No. 722,942, filed December 10, 1924, being designed continually to operate the distance registering device in a forward direction in response to propeller movement in either direction. This invention further relates to the combination of mechanism of the type described above with a signaling device adapted to indicate the direction of propeller shaft movement at a distance from the same, certain aspects of this signaling device being applicable in other installations than in the combination herein disclosed.

Heretofore it has been common in ship's instruments, cyclometers, speedometers etc., to have the register register in response to movement of a shaft, wheel etc. in one direction only, many of these devices being provided with overrunning clutches or equivalent devices to permit the movement of the shaft, wheel or the like in a reverse direction without affecting the registering mechanism. While the mechanism disclosed in the present case is intended more particularly for use in ship's instruments wherein registering means is actuated by propeller shaft movement with a degree of responsiveness dependent upon both the speed and number of propeller revolutions, mechanism of this character may be generally used in instruments for indicating or recording in response to either the speed or number of revolutions of the rotatable member.

The above and further objects and advantages of the invention will be apparent to those skilled in the art upon a reading of the subjoined description and claims in conjunction with the accompanying drawings, in which:

Fig. 1 is an elevational view of the mechanism forming the subject matter of this in-

vention, the wiring in this figure being diagrammatically represented;

Fig. 2 is an end elevation of the gearing illustrated in Fig. 1;

Fig. 3 is a detail elevational view;

Figs. 4 and 5 are top plan views of the gearing and related parts in different positions;

Fig. 6 is a side view of the indicator, and

Fig. 7 is a detail view.

As described in the copending application identified above, the form of my invention shown herewith for purposes of illustration is provided with a gear 1 operatively connected with the propeller shaft and therefore adapted to change its direction of rotation in response to a similar action of that member. Adjoining the gear 1 is the pivotally mounted arm 2 which carries the meshed gears 3 and 4, the latter in turn being engaged with the gear 1. At one side of the arm 2 is located a gear 6, the various gears and the arm being so arranged that rotation of the gear 1 in the direction indicated by the full arrow will rotate the other gears in the directions indicated by the full arrows adjoining them, the thrust of the meshed gears tending to hold the arm 2 in a position wherein gear 4 will be meshed with gear 6. Thus it is evident that when the gear 1 is turning in the direction of the full arrow, the gear 6 will be turned in a similar direction by means of gear 4. However, upon a reversal of the direction of rotation of gear 1, the thrust upon the gear 4 swings the latter out of engagement with gear 6 and throws gear 3 into engagement with gear 6 so that the latter is still rotated in a forward direction although gear 1 is turning in an opposite direction from that previously described.

It is to be understood that the gear 6 is adapted to rotate a suitable shaft 7, which is connected with the distance indicating means of a ship's instrument, or the like, in which the present apparatus may be incorporated, said shaft being adapted to turn the registering mechanism of that instrument continually forward in response to propeller movement in either direction.

Mounted between the hubs 8 and 9 of gears 3 and 4 respectively is a spring 10 having the substantially semi-circular portions 11 fric-

tionally engaging these hubs due to the resilience of the spring in order to prevent free rotation of the gears 3 and 4 when they are freed from engagement with gear 6, or, in other words, the spring 10 acts as a frictional brake upon the gears in order to facilitate their ready engagement with gear 6 when the arm 2 is swung from one position to another. Thus by virtue of the friction brake the arm 2 is always thrown from one extreme position to the other when the gear 1 reverses, whereas if the gears 3 and 4 turned freely on their axes the rocker arm might not reverse when gear reverses or if the arm should start to reverse due to the resistance offered by gear 6 it might stop in mid position as soon as one of the gears 3 or 4 is thrown out of mesh with gear 6 and before the other gear 4 or 3 is thrown into mesh with gear 6, in which case the mechanism controlled by gear 6 would be operatively disconnected from the gear 1.

Suitably mounted upon the ends of arm 2 are the insulator blocks 38 the outer surfaces of which are given a curvature having a radius substantially equal to their distance from the pivot point of arm 2. The transverse contacts 39 are embedded in the insulator blocks 38 at either end of the arm 2 but at the same side thereof (Fig. 3). A pair of resilient brushes 14 normally have their ends retained in engagement with an outer surface of one of the members 38, (Figs. 4 and 5). The contact 39 upon member 38 is adapted to form an electrical connection between the brushes 14 when the arm is in one position, as for example when it is in the position illustrated in Fig. 5 corresponding to the reverse movement of the propeller shaft. Brushes 14 are interposed in an electrical circuit (Fig. 1), which is connected with an electro-magnet 17 disposed beneath the indicator designated generally by the numeral 20. This indicator comprises a conveniently mounted fixed frame 18 pivotally supporting an open frame 21 which comprises a lower cross bar 22 provided with upwardly extending legs 23 which are pivotally supported near their upper ends. Upon one face of the frame 21 is secured a suitably formed sheet metal member 24 which is bent to have the form indicated in Fig. 6 having its outer end provided with the surfaces 25 and 26 at an angle to each other and having suitable symbols or indicia thereon such as the words "Ahead" and "Astern". Members 21 and 24 are so designed that they are normally retained by gravity in the position shown in the full line of Fig. 6 and are swung to the position indicated by the dot and dash lines by energization of magnet 17, the bar 22 acting as an armature for the same. Suitable stops 28 and 29 limit pivotal movement of members 21 and 24 in either direction.

In use, the indicator 20 is adapted to be located within a separate compartment or within the distance registering instrument

and to have either the surface 25 of the surface 26 located in direction registration with an opening 27 which may be provided with a transparent window so that movement of the member 24 will cause either surface 25 or surface 26 to be visible through the opening 27.

In the operation of my device it is to be understood that rotation of the propeller shaft in a reverse direction imparts movement in a similar direction to the gear 1, thereby swinging the arm 2 to a position wherein the bar 39 forms an electrical circuit by means of contacting with the brushes 14, thus serving to energize the electro-magnet 17. The electro-magnet when energized serves to draw the bar 22 to the dotted line position indicated in Fig. 6 lifting the panel 26 to a position where it is in registration with window 27. Change in direction of rotation of the propeller shaft will then cause arm 2 to swing to its full line position as indicated in Fig. 1, thereby opening the switch and permitting the action of gravity to swing frame 22 to its lowered position so that "Ahead" is indicated through opening 27. Meanwhile gear 6 has been continuously rotated in one direction by either gear 3 or gear 4 and the dampening effect of spring 10 has served to facilitate meshing of these gears and consequently has aided the accurate recording by the instrument.

Provision of similar members 38 with contacts 39 at either end of the arm 2 is advantageous since it permits the interchanging of the ends of that member, gears 3 and 4 also preferably being interchangeable so that in certain cases the contact bars 39 may be located adjoining the gear 6 rather than at the opposite side of the arm. Such an arrangement is useful since in different installations the gear 1 may either be connected to the propeller shaft so that it will rotate in the same direction as the latter or in an opposite direction thereto. By the provision of a member 2 having contacts at either end but upon the same side mere interchanging of the ends of the arm will suffice to form an adjustment to take care of such differences in installation of the device.

While the mechanism and allied indicating apparatus disclosed herewith has been described specifically for use together in a ship's instrument, it is of course apparent that they may be used separately, that other suitable means may be substituted for the arm 2 in certain installations or that the mechanism may be applied to uses quite different from those connected with the ship's instrument.

I claim:

1. A device designed accurately to impart rotative movement of a member in either direction to a rotatable element movable in only one direction, said device comprising a swinging arm, a pair of meshed gears mounted thereupon, and a third gear, said

arm being swingable from one position to another upon reversal of movement of the member whereby one or the other of the meshed gears are adapted to engage the third gear in accordance with the position of the arm, and brake means to prevent the free rotation of the meshed gears as the arm is swung from one position to the other.

2. The subject matter of claim 1 further characterized by the fact that said brake means comprise at least one segmental surface resiliently held in engagement with a cylindrical surface upon one of said gears.

Signed by me at Boston, Massachusetts,
this twenty-third day of February, 1926.

GEORGE WALKER.

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