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T. A. DUFF.

APPARATUS FOR REGULATING THE SPEED OF PROPELLER SHAFTS.

APPLICATION FILED MAR. 5, 1903.

NO MODEL.

Fig. 1.

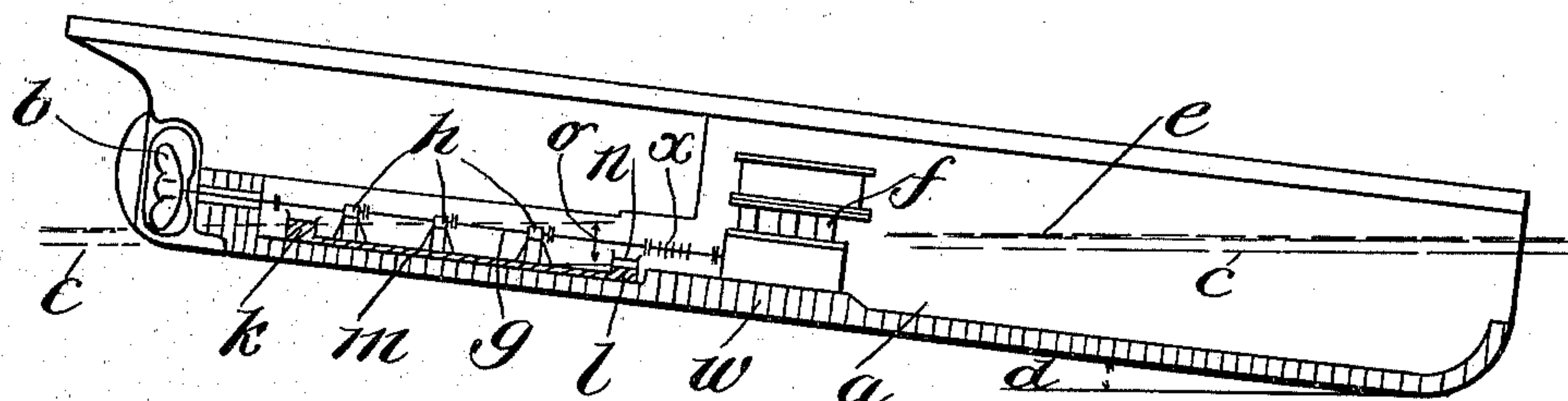
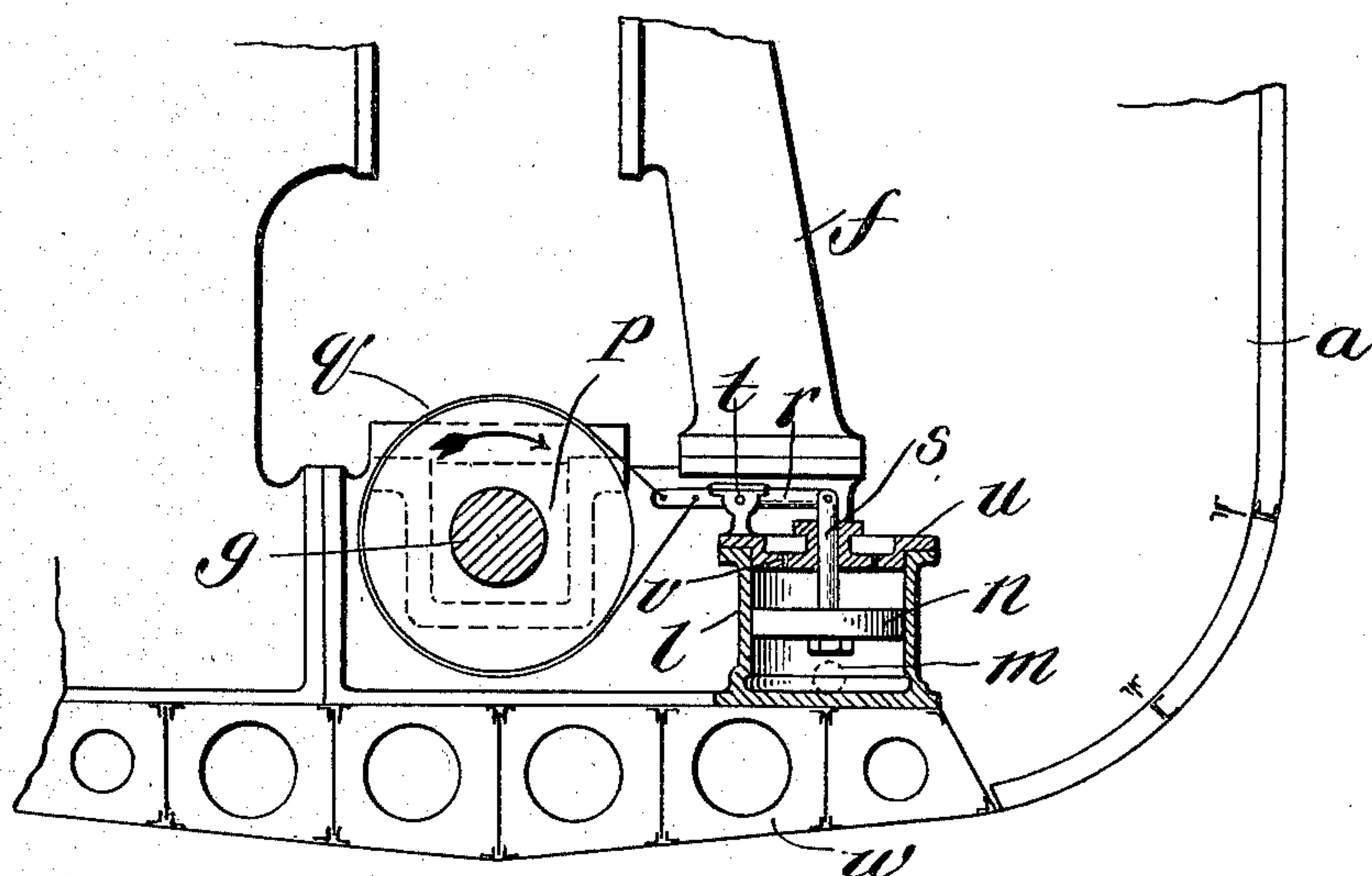


Fig. 2.



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APPARATUS FOR REGULATING THE SPEED OF PROPELLER-SHAFTS.

SPECIFICATION forming part of Letters Patent No. 731,869, dated June 23, 1903.

Application filed March 5, 1903. Serial No. 146,330. (No model.)

To all whom it may concern:

Be it known that I, THOMAS ANDREAS DUIFF, a subject of the Queen of the Netherlands, residing at Rotterdam, Netherlands, have invented certain new and useful Improvements in or Relating to Apparatus for Regulating the Speed of Propeller-Shafts, of which the following is a specification.

This invention relates to apparatus for regulating the speed of propeller-shafts either directly or indirectly in an automatic manner, so as to prevent racing of the engines when the screw is raised more or less out of the water.

It is well known that the engines of screw-propellers work in a very irregular manner when the sea is rough, owing to the stern part of the ship, with the propeller, coming out of the water to a greater or less extent, and the engines may even acquire a dangerous speed, resulting in breakage of the shaft or damage to the engine unless the excessive speed is prevented by throttling the steam or in some other way. Many devices have been proposed for this object; but they have frequently failed, owing to their coming into action too late—that is to say, after the engine has acquired an excessive speed. These drawbacks are particularly noticeable in the devices provided with a float or with two pistons plunging into communicating cylinders filled with water and acting on the throttle-valve or on a brake device by means of a motor actuated by the float or pistons when the level of water in the cylinders changes. Owing to the float or the pistons acting on the throttle-valve or on the brake indirectly, there is loss of time between the time the propeller comes out of water and the moment the brake is applied, so that the engines acquire by that time a dangerous speed. Besides, the water in the communicating cylinders is subject to continuous movement during the pitching of the ship, which movements or oscillations do not correspond in time with the oscillations of the ship, but follow after them. This results in the brake being applied to the engines at unsuitable moments.

According to this invention the drawbacks in question are obviated by the well-known braking device being actuated by the pressure of a column of water, a water-receptacle

being arranged in the stern of the ship and communicating with a cylinder provided with a piston arranged near the center of the ship. When the stern of the ship rises out of the water during pitching, a column of water is formed between the back and the front water vessels and exercises pressure on the piston actuating the brake-band and increases in height, and therefore in pressure, with the inclination of the pitching ship. The result is that the brake is applied to the engines instantaneously and in proportion to the inclination of the ship when its stern part rises and the front part dips.

An apparatus according to this invention is illustrated in the accompanying drawings, Figure 1 showing the arrangement of the communicating receptacles in the ship, Fig. 2 showing the means for actuating a differential band-brake by the pressure of the water column.

The ship *a*, Fig. 1, is shown in position in which the propeller *b* is raised entirely out of the water *c*, the ship forming an angle *d* with the water-surface *e*. Fig. 1 clearly shows the position of the engines *f*, propeller-shaft *g*, and thrust-bearings *h*. Two receptacles *k* and *l* are arranged in the longitudinal axis of the ship at some distance from each other and connected by a tube *m*. A piston *n* is fitted to the preferably circular vertical front receptacle *l*. In the position shown in Fig. 1 the pressure of water under the piston is measured by the height *o* of the water column.

On the engine-shaft *g* is mounted a disk or wheel *p*, Fig. 2. Around this wheel is arranged a differential brake-band *q*, which is tightened or released in the well-known manner by means of a pivoted lever *r*. To the other end of this lever *r*, the fulcrum of which is in a bracket *t* on the cylinder-cover *u*, is secured the piston-rod *s*. The cylinder-cover *u* is provided with ports *v* for the escape of air and is only useful as a guide for the piston-rod *s*. Under the influence of the pressure of the water the piston *n* moves upward and tightens the brake-band *q*. When the pressure of water ceases or diminishes, owing to the back part of the ship sinking, the piston *n* sinks by its own weight, thus releasing the brake-band *q*.

The front receptacle *l* is placed at a suitable point in the ship, preferably next to the forward thrust-bearing *x*, Fig. 1, the rear receptacle *k* being placed as far as possible at the back, for the greater the height of the effective water column the smaller need be the diameters of the receptacles *k* and *l*.

Instead of connecting the piston-rod *s* to the lever of a differential brake-band it could be used to operate brake-shoes surrounding the shaft *g* or the brake-wheel *p*, thus applying the pressure directly to the main shaft.

Care must be taken that the brake-pressure shall not be exercised before necessary—that is to say, not until the propeller is raised out of the water to such an extent as to make racing of the engines possible.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Apparatus for regulating the speed of propeller-shafts comprising two communicating water-receptacles arranged respectively approximately at the rear and center of the vessel, a piston in one of the receptacles, a brake device for the propeller-shaft and an operative connection between the brake device and the piston substantially as described.

2. In an apparatus of the class described, a water-receptacle arranged near the center of the vessel, a piston therein, a brake-disk on the propeller-shaft, a brake-band, a lever connected at one end to the brake-band and at the other end to the piston-rod, and means for supplying water to the receptacle as the stern of the vessel lifts.

3. An apparatus of the class described, comprising a pair of communicating water-receptacles one of which is disposed approximately at the center of the vessel and the other approximately at the stern thereof, a brake mechanism associated with the propeller-shaft, and a movable element in the forward water-receptacle actuated by the water passing from the rear of the receptacle when the stern of the vessel lifts to actuate the movable element to apply the brake mechanism.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS ANDREAS DUIFF.

Witnesses:

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