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MEANS FOR NEUTRALIZING THE OSCILLATIONS OF
A BODY, CHIEFLY THE ROLLING OF A SHIP

2,960,958

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2 Sheets-Sheet 1

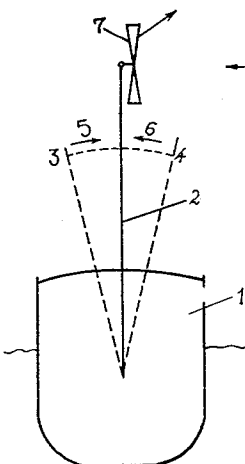


Fig. 1

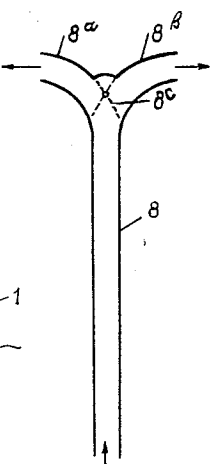


Fig. 2



Fig. 3

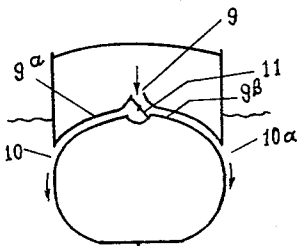


Fig. 4

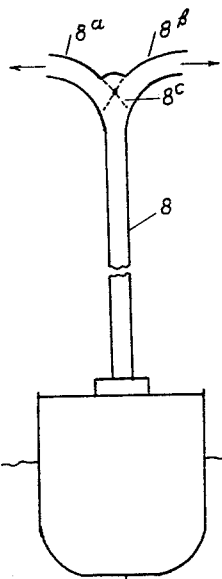


Fig. 6

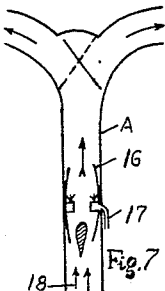


Fig. 7

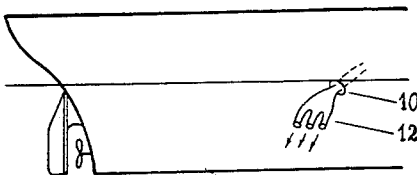


Fig. 5

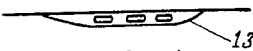


Fig. 5a

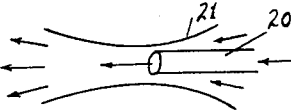


Fig. 10

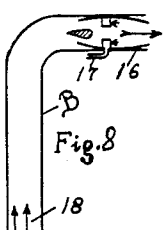


Fig. 8

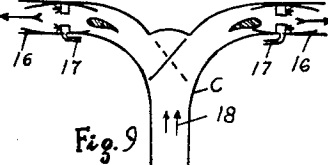


Fig. 9

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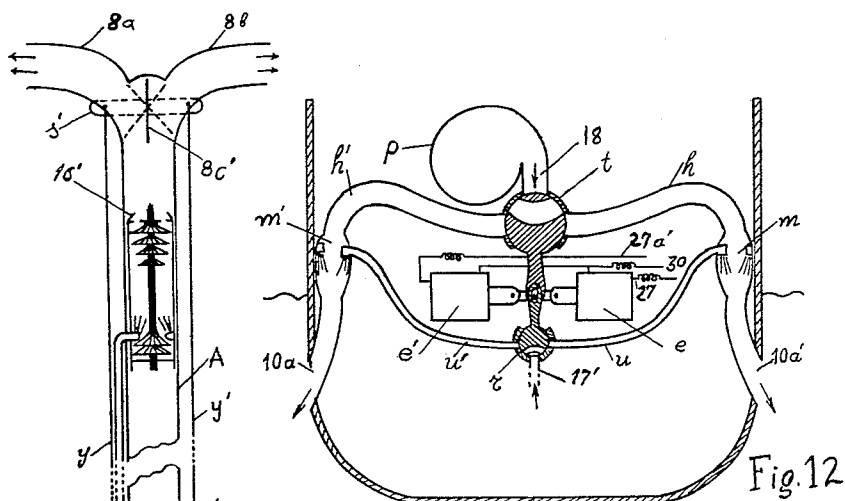


Fig. 12

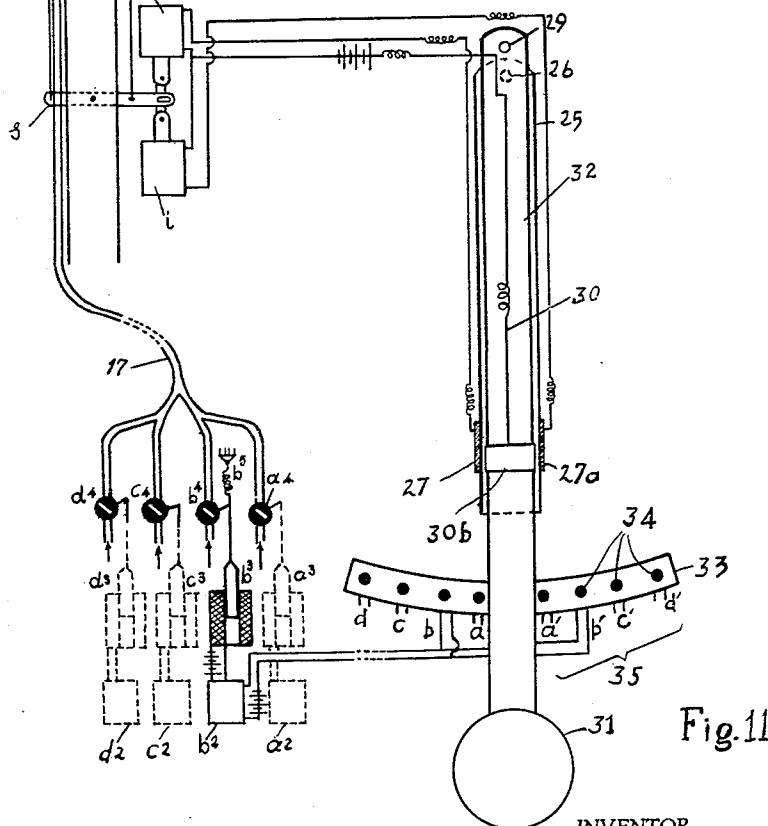


Fig. 11

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MEANS FOR NEUTRALIZING THE OSCILLATIONS OF A BODY, CHIEFLY THE ROLLING OF A SHIP

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9 Claims. (Cl. 114—122)

This application is a continuation-in-part of my earlier filed application, Serial Number 427,570, filed May 4, 1954, now abandoned, which was a continuation-in-part of my application, Serial Number 269,303, filed January 31, 1952, now abandoned.

This invention relates to means for neutralizing the undesirable oscillations of a body and more particularly the rolling of a ship.

The primary object of the present invention is to provide an improved system for neutralizing the rolling of a ship, which will be fully effective and at the same time relatively inexpensive and easy to incorporate in a ship.

While the following description mentions particularly the water ships, it is to be understood that the present method and systems may be applied to other vehicles such as air-ships, dirigibles etc., somewhat adapted to each case if necessary.

The main feature of my method and systems is to develop an uninterrupted and unwillingly not diminishing reacting force at almost unlimited magnitude with reference to the case, whereby to be in all cases fully efficacious. Scope of my invention, concerning especially a water ship, is not only to neutralize its rolling for the comfort of the passengers and the crew, but also to contribute to the salvation of a ship in danger. In the case for example of a ship which bends perilously on one side because of the rolling or chiefly of a violent hurricane which affects the ship persistently on one side, the salvation of the ship may be effected only by the uninterrupted and intensive reaction of an excessively strong gaseous current, that may be efficaciously, easily and rapidly obtained by my antirolling system, chiefly by the embodiment of devices supplying burned gaseous current of almost unlimited force for the case. These devices (ram-jets, turbo-jets or the like) are not mentioned in my present application as any whatsoever mechanism, producing simply a gaseous antirolling current, but as mechanisms which can particularly produce gaseous currents of excessively very great, almost unlimited magnitude for the case, as required often for the realization of the features of my method, of which the employ of the above devices constitutes a special characteristic, closely connected with my systems. While such very strong currents cannot or are very difficult to be obtained by the means employed till now, which moreover do not work with satisfactory efficiency especially in the case of great ships. By such strong, intensively and uninterruptedly acting means it is also possible to neutralize rapidly a large rolling or a great bending of a ship for the purpose of preventing a probable and very dangerous resonance with a rhythmically continuing series of waves.

According to my invention a strong fluid current created on board the ship, is directed alternately right and left against an ambient medium in the direction of the roll of the ship and as far as possible from its center of gravity, in order to make the reacting force of the cur-

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rent act with the longest possible leverage, the alternative changing of the direction of said current being obtained instantaneously by a novel pendulum pilot-device so that the reacting-current can act effectually during all the period of the rolling in one direction, as it is indispensable, to which contributes considerably the fact that my system is practically deprived of inertia, and the working mechanisms turning always in the same direction, while the reaction force is varied by a novel automatically working pendulum-regulator device operating proportionately according to the amplitude of the oscillations, said force remaining the same during all the phase of the rolling in one direction as it is also indispensable. In such a way the amplitude of the oscillations is rapidly diminished and at last brought to a stop.

Because a water ship is partly in the air and partly in the water, it is possible to react against the oscillations, taking as a starting-point one of these parts or both at the same time.

Examples of ships embodying the invention are illustrated in the accompanying diagrammatic drawings in which:

Fig. 1 is a diagrammatic view of a ship provided with a screw-propeller mounted at a high point for producing alternately right and left air currents.

Figs. 2 and 3 are diagrammatic views which show tubes for conducting a gaseous current alternately right and left.

Figs. 4, 5 and 5a are diagrammatic views showing ships provided with means for the application of this invention below the water line.

Fig. 6 is a diagrammatic view showing the relationship between a ship and a mounting tube as shown in Fig. 2.

Figs. 7, 8, and 9 are diagrammatic views showing the upper end of mounting tubes of the type illustrated in Figs. 2 and 3 provided with ram jets (schematically shown) producing burned gaseous currents of whatever magnitude.

Fig. 10 is a broken diagrammatic view of a Venturi type ejector for delivering a fluid in accordance with the invention.

Fig. 11 is a diagrammatic view showing a general combination of parts and the specific form of the elements and at the same time a complete embodiment of my novel pendulum device, which, to offer an example, is here combined at the end with, and controls means by which is canalized and regulated the flow of the fluid, as for example of a gaseous current or of the fuel canalized to a ram jet, a turbo jet, or the like, resulting finally in the regulation of the intensity of the reacting force proportionately to the amplitude of the oscillations of the pendulum. The same embodiment acts also as pendulum pilot.

Fig. 12 is a view partly in section and partly diagrammatic which shows the same combination as that of Fig. 11 adapted here for the application of the method and systems below the water line as thereafter will be described.

Referring to Fig. 1, in which the reaction for the ship 1 is produced in the air, the ship is provided with a mast 2 mounted perpendicularly. When the ship rolls, the mast traces the arc 3—4 in a rough sea alternately from right to left and from left to right. If, at the moment when this mast is at the end-point 3 and begins its course to the end-point 4, a continuous strong gaseous current is blown, having as a starting point a considerably high point of this mast 2, or another special prop, this current having the direction of the arrow 5, will react to the motion to the point 4, and the mast 2 will not reach the point 4, which is reached at the previous oscillations.

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The same will occur, but in the opposite sense, if at the departure of the mast from the end-point 4 a strong current is blown in the direction of the arrow 6. If this braking-current is blown at every departure of the mast from the end-points 3 and 4, the arc 3—4 will be diminished and at last the oscillations will stop.

The current can be produced locally, for example by a screw-propeller 7 or by some other suitable device (as for example, by a ram-jet, a turbo-jet or the like as shown in Figs. 7, 8, 9 and 11) put high upon the prop-mast. The screw-propeller or other similar device may be operated by the use of a motor connected with it, or through a transmission shaft, operated by a motor placed upon or under the ship's deck.

In order to obtain the change in direction of the flow of the current, the mechanism can make a semi circular rotation from right to left and from left to right, while the current traces during these changes an arc directed to the stern of the ship, thereby avoiding interference with the forward movement of the ship.

If a screw-propeller such as 7 of the Fig. 1 is employed the change in direction of the current is obtained by the known means for reversing the pitch of its blades.

The gaseous current may also be produced within the hull of the ship or in the mast itself by known means, as for example by a compressor or a centrifugal pump or by a turbo-jet, a ram-jet or the like, as hereafter will be more extensively disclosed and then directed in a stream through a tube 8, which at the same time may constitute the mast, and which, extending up to the required height, is divided into two discharge ducts 8a and 8b, of which one point end discharges to the right and the other to the left side of the ship (Fig. 2). At the junction of the said ducts a movable fly valve 8c closes alternately one discharge duct and thus the current of gas is directed to the other open duct. The bifurcation can take place low down, upon or under the deck and then the two tubes are directed upward, the one behind the other to present smaller resistance to the ambient air.

The laterally blown currents are not absolutely perpendicular to the longitudinal axis of the ship but are directed slightly toward the stern, thereby avoiding and counterbalancing interference with the forward movement of the ship.

The Fig. 3 shows a rotary tube 8e having its upper end laterally curved. In this case the change in direction of the current is obtained by the semi-circular alternative rotation of the tube.

The higher the mast, serving as a lever-arm, the more effective force in the reaction opposed to the rolling or oscillations of the ship.

Preferably the cross section of the parts of the system constituting its superstructure, have aerodynamic shape, as also the section of the blown strong current, so as to present smaller resistance to the forward motion of the ship.

The direction of flow of the current must be reversed as rapidly as possible in order to avoid loss of precious time, particularly with ships having a relatively low tonnage and consequently having a relatively short period of rolling. For this purpose the blades of the screw-propeller 7 are reversed, and the changing of the direction of the valves is made instantaneously, for example by two oppositely fixed electro-magnets *i* and *i'* as shown in Fig. 11, attracting alternately a lever, which by pull wires or other known means act on the blades or on the valves.

The alternative operation of said electro-magnets is controlled either by the known means of a gyroscope-pilot, which acts upon suitable electric contacts, or much preferably by my novel pendulum-regulator acting then as pendulum pilot, as it is hereafter described.

When the work to be done is of greater magnitude than that which can be accomplished by electro-magnets,

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as for example the semi-circular rotation of the mast, then known devices actuated rapidly by compressed air or liquid may be employed; these devices may also replace the pull-wires acting on the valves or on the blades of the screw-propellers.

In order to obtain effective action and good results with anti-rolling devices, it is indispensable to vary automatically the intensity of the reacting-force proportionately to the amplitude of the oscillations of the ship, which is accomplished by my novel pendulum-regulator shown in Fig. 11 in which a heavy pendulum 31 moves in a transversal plane of the ship during the oscillations of the rolling, proportionately to their amplitude. The pendulum-rod 32 during its alternative movement on the buttons 34 which are arranged in its way upon a mounting arch 33 of insulating material, each button when pressed actuating a corresponding switch of the retarded interruption type. This pendulum-regulator device shown in Fig. 11 is extremely simple, easy and cheap to construct and to install, undisturbable, of unfailing and precise function and works as follows: When the pendulum-rod in its oscillations presses upon an electric button of the series 34, for example the button corresponding to the pair of wires *b*, electric current is established through this pair of wires and actuates the correspondingly connected switch *b2* of the automatic retarded interruption type, which, in its turn energizes the corresponding electromagnet *b3*, which then opens the cock *b4* which crosses a conduit through which a gaseous or a fluid current (as for example fuel) is canalized, while when the button ceases to be pressed, electric current is not immediately interrupted but continues unchanged for a predetermined time, for which the switch *b2* is suitably adjusted and at last the electric contact is automatically disconnected, if meantime the button is not pressed again and the switch *b2* is not again actuated, as it happens for example in the staircase and other similar switches. This effect is obtained by, for example, electrically working switch as above or by clock mechanism working known devices. Each pair of two buttons both placed at the same distance of both sides of the middle of the arch 33, as for example the buttons *b* and *b'* are responsive to equal energy. The switches are so adjusted that said period of retardment of the interruption of the current exceeds somewhat the time spent between two successive pressings of the pendulum-rod upon buttons responsive of equal energization, to avoid undesirable diminishing and interruption of the current. The greater the amplitude of the oscillations the greater the number of buttons pressed and circuits made through the pairs of wires 35 and respective switches actuated and vice versa. By such a way the various electric currents created by the switches are used to regulate the intensity of the reacting force proportionately according to the amplitude of the oscillations, such electric currents acting for example upon the electric motors or upon the extent of the pitch of the blades of the screw-propeller, or upon the flow area of the conduits, or opening or change the necessary number of the cocks or valves that furnish the supply of motive fluid each time according to the power required.

Furthermore, by the above-described pendulum-regulator device, particularly by its switch, having automatic retarded interruption is obtained the precious effect that during the entire course of each oscillation in one direction, the magnitude of the reaction force, as it is indispensable, remains firmly unchanged and equal to that responding to the farthest button pressed by the pendulum-rod in this oscillation. While when the amplitude of the oscillations increases and consequently the number of the buttons pressed by the pendulum-rod is increased in accordance, then the magnitude of the reaction force is proportionately increased and vice versa.

The flow areas of the conduits containing cocks *a4*, *b4*, *c4*, *d4* of Fig. 11 may be of equal diameter. In

this manner when two following buttons are pressed by the pendulum, the flowing fluid becomes two fold; if three, three-fold, and so on. But when a more rapidly increasing of the reacting force is desired, then the area of each conduit is wider than that of the preceding conduit. While the last cock *d4* is adjacent to the critical and dangerous bending of the ship, it is preferably responsive to an excessive increasing of the reacting force to react immediately and efficaciously to the danger. Consequently the reacting force is each time equal to the sum of forces generated by the buttons pressed and switches actuated. In Fig. 11, 17 is the common tube for the flow of fluid. The arch 33 can be displaced to the right or left for the purpose of bringing the pendulum rod in the middle of the arch, when the mast of the ship, for whatever reason as for example an irregular loading, is not perpendicular with respect to the surface of the calm sea and consequently the pendulum-rod is not in the middle of the arch.

The pendulum-regulator performs at the same time the function of pendulum-pilot, instead of a gyroscope-pilot after being additionally provided with the suitable means as follows:

A lever 25 (Fig. 11) which can be moved under frictional restraint around the axis 26 has fixed on each of its sides two electrodes in the form of two prominent isolated small metallic plates 27 and 27*a* respectively connected to two flexible wires, which are in turn respectively connected to the electromagnets *i* and *i'* referred to above. Between the two plates is placed a third electrode in the form of the contact body 30*b* (Fig. 11) surrounding the pendulum-rod 32, which oscillates freely around the axis 29 (Fig. 11). The distance between the two plates 27 and 27*a* is greater than the thickness of the electrode 30*b* thereby the electrode 30*b* cannot come in contact with both plates 27 and 27*a* at the same time, but, during the oscillations, when the rod goes to the right the electrode 30*b* comes immediately into contact with the right plate and when it goes to the left, the electrode 30*b* comes in contact with the left plate, because the lever 35 offers a certain resistance to these movements. The electrode 30*b* is connected with a current supply wire 30. In this manner two electrodes, which may be displaced under frictional restraint are drawn by a third electrode interposed between these and carried by the pendulum-rod, which electrode, alternately, as soon as the pendulum-rod departs from one end point, ceases to touch the one of the two electrodes and touches the other, thereby changing automatically and immediately the direction of the reacting current, conformably to that of the commencing course of the rolling of the ship.

The above described pendulum device, differs to the known pendulum device by being provided with very simple novel means, viz. by some electric buttons, which actuate switches of the automatic retarded interruption type, for controlling automatically the intensity and by two tightly drawn electrodes alternately actuated, for changing automatically and instantaneously the direction of the reacting current. Furthermore by said means the intensity of the reacting current remains the same during the whole course of the rolling in one direction, at it is indispensable. Such pendulum functions with great precision, is undisturbable and satisfies all the desiderata.

It is understood that two separate pendulums may be employed the one functioning as pendulum-pilot and the other as pendulum regulator.

On a ship may be adapted one or more of my devices for neutralizing the rolling, but always in equilibrated points of the longitudinal axis of the ship to avoid any deviation of the navigation line of the ship.

If two of such devices are adapted at each end portion of the ship we can use them as a helm, to cause the ship to turn directing the one current to the right and the other to the left side of the ship, or reversely, whilst

we have stopped the mechanism which changes automatically the alternative direction of the reacting currents.

Figs. 4 and 5 show a ship embodying the invention, the gaseous or mixed current reacting here below the water-line. The Fig. 4 is a diagrammatic transverse section of the ship. The current of gas comes from the tube 9 which is bifurcated into the downwardly directed discharge ducts 9*a* and 9*b* by which the current is conducted to the outlet opening 10 and 10*a* below the water-line. The direction of the current towards the water is perpendicular to a line directed from the outlet of the current to the centre of gravity of the ship. At the bifurcation point a movable valve 11 closes alternately the one duct and so the current is directed to the other, by a mechanism analogous to this of the Fig. 11, which moves the valve 8*c*.

The Fig. 5 shows a ship like this of Fig. 4 in which the outlets 10 and 10*a* extend out of the hull and are subdivided in several smaller ducts 12, which are shown bent slightly toward the stern, thereby avoiding and counterbalancing interference with the forward movement of the ship. These ducts 12 may be covered by a cover 13, which is shown in the Fig. 5*a*, and has a surface of aerodynamic shape.

The outlets 10 and 10*a* of the Fig. 4, and 12 of the Fig. 5, may be combined advantageously with a Venturi as shows in Fig. 10. In such a manner the air current draws particles and bodies of water and so creates at its issue a violent mixed hydrogaseous current more effective.

The Fig. 6 indicates the relationship of the mounting tube 8 with the ship.

The Figs. 7, 8 and 9 show mounting tubes provided with turbo-jets 16; 17 is a fuel delivery pipe and 18 indicates air current necessary for the working of the ram-jet. In case of, instead of ram-jets, turbo-jets are employed, such an air current is not necessary.

The Fig. 11 shows the pendulum above described combined here with the mounting tube A, like this of Fig. 2, into which a turbo-jet 16' is indicated. The fuel comes from the delivery pipe 17. The produced strong gaseous current is canalized alternately right and left by the valve 8*c'* which is displaced alternately by the lever *s'*, which is displaced in its turn by the lever *s*, these two levers being bound together by two wires *y* and *y'*. Two electromagnets *i* and *i'* displace the lever *s* alternately upwards or downwards in accordance to the electric current coming from the electric plates 17 or 17*a* of the pendulum device.

The Fig. 12 shows a ship including the antirolling system adapted here for the reaction under the water line as shown in Figs. 4 and 5. The reacting air current is produced by the continuously working of the centrifugal fan *p* and is canalized right and left, by the tubes *h* and *h'*, to the outlets 10*a* and 10*a'*. In the tubes, adjacent to their outlets, two ram-jets *m* and *m'* may be adapted. While the air reacting current may be employed such as it comes from the fan *p*, traversing the ram-jets which do not constitute an important impediment to its passage, however, for an effective reaction of great magnitude, almost unlimited, the ram-jets are set in action reinforcing thus excessively the air current. The cock *t* sends the air current alternately to the right and to the left, being displaced by the electromagnets *e* and *e'*, which work as the electromagnets *i* and *i'* of the Fig. 11; *u* and *u'* are the fuel delivery pipes; *r* is a cock alternately canalizing the fuel to the right or to the left and is moved by the electromagnets simultaneously with the cock *t* thereby air current and fuel are both simultaneously canalized once—to the right ram-jet and once to the left ram-jet.

It is obvious that my described system may be also used to provoke a desirable motion of a ship, as well as to neutralize an undesirable movement other than the rolling, as for example the pitching of the ship; but it

is worth remembering that the neutralizing of the pitching, as known, can be dangerous for a ship in rough sea.

The gaseous current is preferable to a water-stream in reacting against the oscillations of a ship, even below the water-line, as it occurs naturally in the air, since the gaseous-current is easy to produce, to conduct and to regulate and generally to install and manipulate. It has also the great advantage to be practically deprived of weight and of inertia. This advantage is important in a system in which the intensity and the direction of flow of the fluid is always being changed and must be immediately changed.

The gaseous current can be produced by the means already briefly mentioned and it may consist of various gases as for example of burned gases under pressure (produced for example by a turbo-jet or a ram-jet or the like), or of simple gas (for example air, steam) or of mixed gas.

The means for producing the gaseous current are of great importance, since this current must be very strong, so as to neutralize the great inertia of the rolling ship. It may be produced locally as it is already mentioned by a screw propeller, having reversible blades, or by another suitable device. A ram-jet or a turbo-jet for example placed in the tube 8 Fig. 2 as it appears in the tube A of the Fig. 11, can produce a current having easily however required power and directed alternately to the discharge ducts 8a, 8b by displacement of the valve 8c. This turbo-jet may also be placed horizontally in the laterally-extending duct of a mounting air tube, like the tube 8e in Fig. 3, in which case it makes a semi-circular movement alternately right and left, pushed by the means before described. Instead of a turbo-jet a ram-jet may be used as shows in the Fig. 8. In this case a current of air 13 is directed through the tube 8 to the ram-jet for its functioning. Instead of one ram-jet, two similar ram-jets may be adapted into each discharge duct 8a and 8b, in which case said air-current is directed alternately right and left to the respective ram-jet, which simultaneously is supplied with the necessary fuel. This construction is shown in Fig. 9, in which 16, 16 indicate the emplacements of the ram-jets or turbo-jets, 17, 17 the fuel conduits and 18 the air current. In this manner, alternately, the one ram-jet functions, whilst the other is stopped.

The above mentioned devices producing burned gases under pressure present the great advantage to be able to produce easily a reacting current of whatever great magnitude, as it is often necessary chiefly for the great ships.

In the case of a ship which bends perilously on one side because of the rolling, or chiefly, of a violent hurricane which affects the ship persistently on one side, the salvation of the ship may be effected only by the uninterrupted reaction of an excessively strong gaseous current; that may be efficaciously, easily and rapidly obtained by my anti-rolling system, chiefly by the embodiment of devices supplying burned gaseous currents of almost unlimited force for the case.

Another important feature of my invention is the advantageous employ of mixed fluids, already briefly mentioned, which are obtained by one fluid drawing another fluid and transmitting to the particles of this latter the necessary reacting speed, by means of an ejector, a Venturi, or the like, numerous smaller ones preferably employed, rather than one large one. For example if a strong current of steam is blown from a discharge duct 20 (Fig. 10) into the Venturi 21, it will draw air and so a mixed gaseous reacting current is obtained and blown against the ambient medium air or water. Furthermore if this mixed current or a current of simple air is blown in a Venturi immersed in the water, it will draw water, thus creating an advantageous mixed hydropneumatic reacting current which current may be very successfully utilized below the water-line. Such current is prac-

tically deprived of inertia since the water is drawn only after the escape of the gaseous current from the discharge duct and is immediately blown to the ambient water through the second Venturi.

Advantages of my system:

(1) It can develop an uninterrupted and not unwillingly diminishing reacting force at almost unlimited magnitude, with reference to the case, whereby it is in all cases, fully efficacious.

(2) It is easy and cheap to construct and to install on existing ships without requiring special location and without necessitating the docking of the ship.

(3) It is constituted of simple and solid elements and its very effective function is easy, precise and undisturbable.

(4) It neutralizes the rolling of the ship even when this latter is stopped for whatever reason. On the contrary other anti-rolling systems, as for example, these including lateral fins (horizontal rudders) are absolutely inoperative when the ship is stoped, or moves slowly forwards, which may be prejudicial in rough seas.

(5) When a ship cannot move, because of damage, the present system may serve to give a certain propulsion to the ship by suitable direction of its reaction currents, as also, if two such anti-rolling devices are installed on a ship (to the prow and to the stern), they can serve as a helm to turn and to direct the stopped ship in the most favorable direction against the tempest and the waves. That is impossible with systems including horizontal-rudders.

(6) If a ship is running aground, passive lateral oscillations of the ship can be easily provoked by the present system, which in certain cases may contribute to the refloating of the ship.

(7) It is known that if air is blown in the form of bubbles under water in rough sea, this latter becomes sufficiently calm. Consequently my device of ejecting gaseous or hydrogaseous currents under water, presents an additional advantage in rough seas.

It is to be understood that this invention is not limited to the particular forms above described, but that they may be variously modified without departing from the spirit of this invention, as also it may be applied either integrally in its whole, or merely in part. Furthermore it may be applied to other vehicles than the water ships; as for example to air ships, dirigible etc., after somewhat conveniently adapted, if necessary.

I claim:

1. A system for neutralizing the periodic oscillations or rolling of a ship, comprising means on board the ship for creating an uninterrupted strong gaseous current, means for directing said gaseous current alternately to the right and left in the direction of roll of the ship against an ambient medium exterior to the ship, said directing means being located and supported in a position remote from the center of gravity of the ship, means for varying the intensity of the reacting force created by the gaseous current proportionately to the amplitude of the oscillations of the ship, said varying means including a series of electric buttons, each of which, when pressed, actuates a corresponding switch of the automatic retarded-interruption type, a pendulum regulator mounted on the ship in a position for pressing said buttons in accordance with the position of the pendulum during the oscillation of the ship, while the intensity of the reacting force remains exactly the same during the entire course of the roll of the ship in one direction, said intensity for each beginning course being determinated and settled each time at the end-point of the last course of the rolling which constitutes also the starting point of the beginning course, and depending on the number of the switches actuated by the pendulum, that depends on the amplitude of the last oscillation of the pendulum, which is proportional to the amplitude of the corresponding course of the rolling, means for changing automatically and instantaneously the

current directing means to thereby change the direction of the gaseous current in accordance with the roll of the ship to apply a reacting force to the ship in a direction opposite to that of the roll of the ship, and means for controlling said changing means including an electric circuit having a pair of electric terminals operatively associated under frictional restraint with the pendulum to be alternately energized for reversing instantaneously the direction of the gaseous current, whereby the amplitude of the oscillations of the ship are diminished and neutralized.

2. The system as claimed in claim 1, in which the means for creating the strong gaseous current comprises at least a gas delivery tube, and means for supplying burned gases to said delivery tube.

3. The system as claimed in claim 2, in which the burned gas supplying means is selected from the group of mechanisms consisting of a turbo-jet, a ram-jet or the like which can easily and immediately produce burned gaseous currents of the often required very great force.

4. The system as claimed in claim 1, in which the means for creating a strong gaseous current comprises means for directing a primary gaseous current into another fluid to create a mixed current.

5. The system as claimed in claim 4, in which the directing means includes an ejector of the Venturi type.

6. The system as claimed in claim 5, in which the Venturi ejector is located below the water line of the ship, whereby the primary gaseous current is directed into water, thereby creating a mixed hydro-gaseous reaction current below the water line of the ship.

7. The system as claimed in claim 1, in which the means for directing the strong gaseous current is arranged to direct the current in the direction of roll of the ship and slightly toward its stern thereby avoiding interference with the forward movement of the ship.

8. A ship provided with means for neutralizing the periodic oscillations or rolling of the ship, comprising means on board the ship for creating an uninterrupted strong gaseous current, means for directing said gaseous current alternately to the right and left in the direction of roll of the ship against a medium exterior to the ship, said directing means being located on the ship proper in a

position remote from the center of gravity of the ship, means for automatically varying the intensity of the reacting force created by the gaseous current proportionately to the amplitude of the oscillations of the ship, said varying means including a series of electric buttons each of which, when pressed, actuates a corresponding switch of the automatic retarded-interruption type, a pendulum regulator mounted on the ship in a position for pressing on said buttons in accordance with the position of the pendulum during the oscillation of the ship, means for changing automatically and instantaneously the current-directing means to thereby change the direction of the gaseous current in accordance with the roll of the ship to apply a reacting force to the ship in a direction opposite to that of the roll of the ship, while the intensity of the reacting force remains exactly the same during the entire course of the roll of the ship in one direction, said intensity for each beginning course being determined and settled each time at the end-point of the last course of the rolling, which constitutes also the starting point of the beginning course, and depending on the number of the switches actuated by the pendulum, that depends on the amplitude of the last oscillation of the pendulum, which is proportional to the amplitude of the corresponding course of the rolling, and means for controlling said changing means including an electric circuit having a pair of electric terminals operatively associated under frictional restraint with the pendulum to be alternately energized for reversing instantaneously the direction of the gaseous current, whereby the amplitude of the oscillations of the ship are diminished and neutralized.

9. The ship as claimed in claim 8, in which the gaseous current-directing means comprises a conducting tube having at least one laterally-extending outlet portion, said gaseous current consisting of burned gases produced by means selected from the group of mechanisms consisting of a turbo-jet and a ram-jet.

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