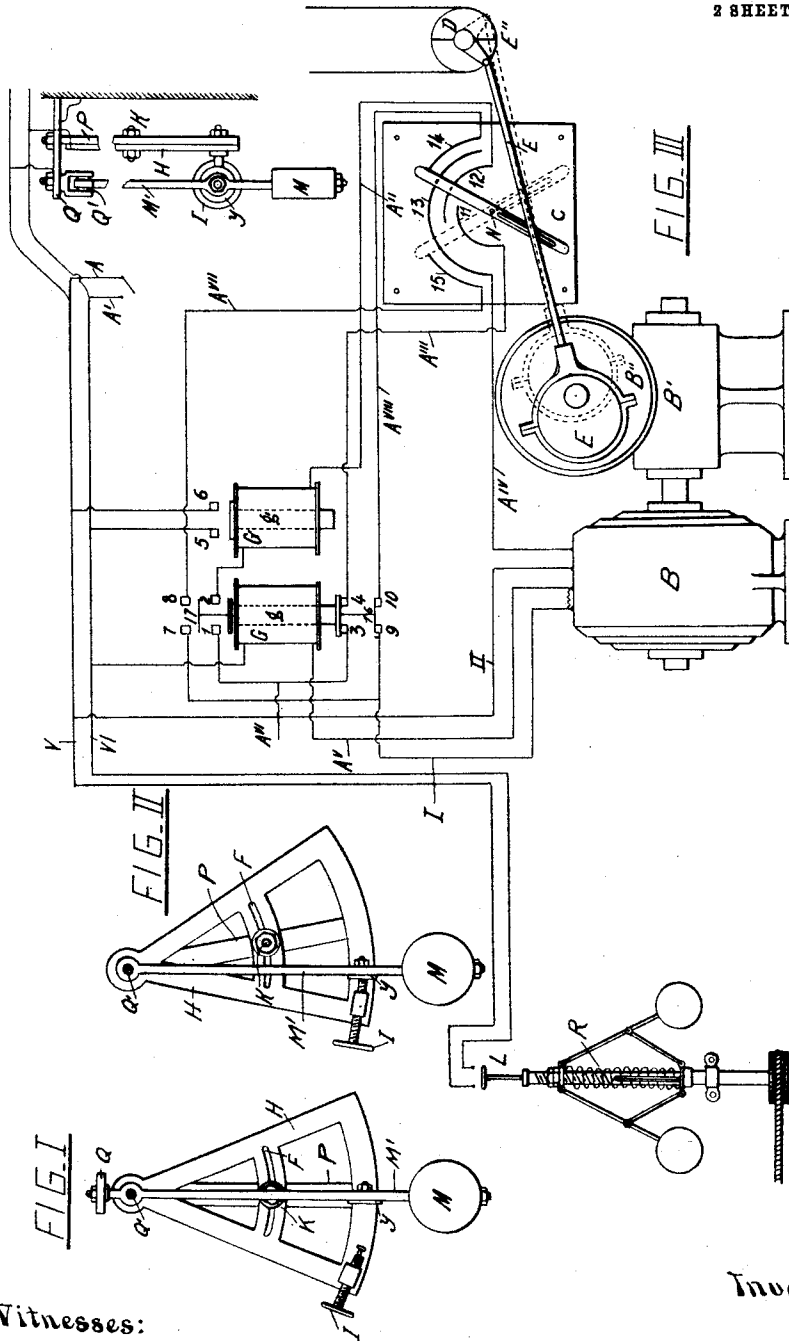


S. RUMOLINO.
MARINE GOVERNOR.
APPLICATION FILED APR. 1, 1912.

1,107,844.

Patented Aug. 18, 1914.

2 SHEETS—SHEET 1.



Witnesses:
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Edward H. Tibbels

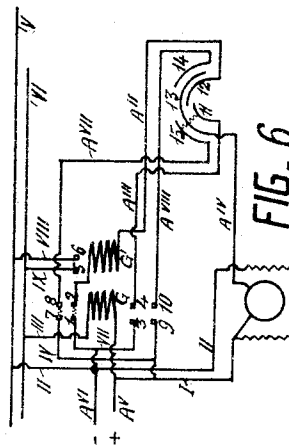
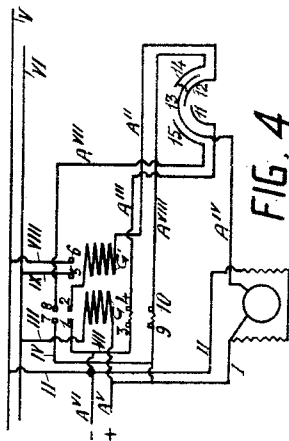
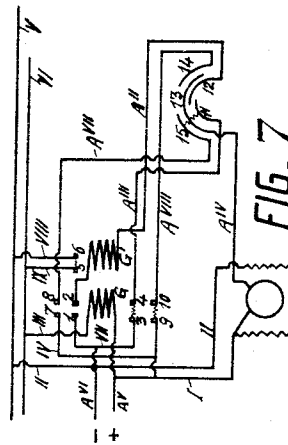
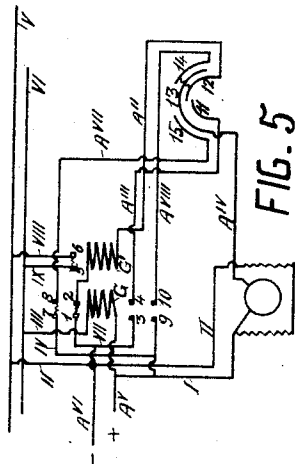
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By *Glenn Noble*
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2 SHEETS—SHEET 2.



WITNESSES

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SANTO RUMOLINO, OF GENOA, ITALY.

MARINE GOVERNOR.

1,107,844.

Specification of Letters Patent.

Patented Aug. 18, 1914.

Application filed April 1, 1912. Serial No. 687,823.

To all whom it may concern:

Be it known that I, SANTO RUMOLINO, engineer, a subject of the King of Italy, residing at Genoa, Italy, have invented certain new and useful Improvements in Marine Governors, of which the following is a specification.

The present invention relates to that kind of controlling devices for the throttle valves of steam engines, especially marine engines, which consist of some electro-magnetic apparatus for operating the throttle valve whenever the circuit is closed, which closure is brought about either by the movements of a pendulum which swings longitudinally of the vessel whenever the vessel pitches, or else by the movements of a governor which is operated by the engine when the number of revolutions of said engine is increased. Devices of this character which have heretofore been proposed have usually been subject to the operation that any outer impulses which may temporarily break the contact with the pendulum or with the governor, will as a matter of course, cause a frequent opening and closing of the electric circuit, which is apt to give an irregular and unreliable operation to the device.

It is the purpose of the present invention to prevent, the further influencing of the electro-magnetic apparatus which operates the throttle valve, by the pendulum or the governor, after the circuit has once been closed, until said throttle valve is fully closed, thereby exactly limiting the closure of the throttle valve.

One form of this invention is shown in the drawings, in which:

Figure 1 shows the pendulum for opening and closing the electric circuit which operates the throttle valve. Fig. 2 shows the same pendulum in the position in which the circuit is closed through the same. Fig. 3 is a diagrammatical view showing the electrical connections between the throttle valve and the pendulum arrangement which serves for a complete shutting off of the steam, and also between said valve and the controlling device which serves to prevent the engine from exceeding a definite given speed. Figs. 4-7 illustrate the path of the electric circuit during different working phases of the controlling device.

The pendulum device consists mainly of a weight M, secured to a rod M' which is pivoted at Q' to a plate Q of insulating mate-

rial, which plate Q is rigidly connected to the steamer; and consists further of the metallic link H, provided with a slot F and a bolt K for the purpose of limiting the swing of the pendulum to such an extent as is admissible without closing the circuit. The metallic link H is so connected to the plate Q that the pendulum may swing in the longitudinal plane of the vessel. Both the link H and the pendulum are of electrically conductive material.

Whenever the contact Y on the pendulum and the adjustable contact I on the link H touch each other, through the swinging of the pendulum caused by the pitching of the vessel, the circuit containing said link and pendulum will become closed. The electric current will act immediately, by means of a device hereinafter to be described, on the throttle valve, and closes it, whereby the engine will be stopped. In the same manner the ball governor R will act on the throttle valve, the circuit being closed by contacts being brought about by the movements of the governor arms.

The device for operating the throttle valve of the engine consists principally of two electro-magnets G and G' with movable armatures g and g', which simultaneously bring about the connection between the contacts 1, 2, 3 and 4, 7 and 8, 9 and 10 for the electro-magnet G and between the contacts 5 and 6 for the electro-magnet G'; further of an electric motor B with speed reducing gear consisting of a worm contained in a casing B' and of a worm wheel B'', on the shaft of which is mounted an eccentric E which regulates the throttle valve D of the engine by sliding the arm E' and rotating the lever E''. The arm E' serves at the same time for operating a lever N of an electric switch C, which closes and breaks the electric circuit at the proper moment.

The manner of operation of the apparatus is as follows: As long as contact y and contact I on the link are separated, the armatures g and g' of the electro-magnets G and G' are in the position as shown in Fig. 3, i. e. below, the motor is at a standstill and the throttle valve is open. Thereby the eccentric E, the lever N on the switch C and the lever E'' on the throttle valve D will have the position as shown in Fig. 3 in dotted lines. While the field winding of the motor remains constantly excited,—because the current flows uninterruptedly

from the positive pole of the source of electricity over A^V and conductor I to the field winding and over the conductor II and A^{VI} back to the negative pole,—on the other hand the armature circuit A^V , I, armature of the motor A^{IV} , contact 13, contact 11, A^{III} , contacts 4-3, VII, A^{VI} is interrupted between the contacts 11 and 13, so that the motor will be at rest (Fig. 4). On the other hand a short circuit through the armature of the motor has the following path: A^V , contacts 9-10, A^{VIII} , contact 14, lever N, contact 13, A^{IV} , armature of the motor, I, A^V (Fig. 4). As soon as the contact on the pendulum or the one controlled by the ball governor is closed, the electric circuit will flow from the positive pole of the source of electricity over A^V to the electro-magnet G and back to the negative pole over III, VI, the contact on the pendulum, V, II and A^{VI} . Hereby the winding of the electro-magnet G will become excited and its armature will be attracted, so that it will make connection between the contacts 1 and 2 and 7 and 8, while the contacts 3-4 and 9-10 will be at the same time interrupted (Fig. 5). There will now be a circuit from A^V over I to the armature of the motor and further over A^{IV} , contact 13, lever N, contact 12, A^{II} to the winding of the electro-magnet G' and over contacts 2 and 1, VII, A^{VI} , to the negative pole. This will cause the motor to start and will make the lever N rotate to the point where it gets out of touch with the contact 12, which means a closure of the throttle valve. The electro-magnet G' which is switched in between the electro-magnet G and the motor, prevents, that any separations between the contacts on the pendulum and on the link, which might be caused by any impulses acting on the contact of the pendulum would cause the electric current through the electro-magnet G to run by jerks, as well as the consequent up and down movements of the armature of said electro-magnet, which movements would bring about an irregular operation of the apparatus. For instance, as soon as the magnet G' is excited, it will attract its armature g' which will then effect the connection between the contacts 5 and 6, so that over the conductors VIII and IX there will be formed a branch circuit to that circuit which was closed by the contact on the pendulum. The contacts 5-6 are not separated again before the lever N has been turned by the motor to the position as shown in the Fig. 3 in dotted lines, in which position the throttle valve shuts off the steam from the engine. When the lever N has left the contact 12, the armature circuit A^V , I, armature of the motor A^{IV} , contact 13, contact 12, A^{II} , magnet G', contacts 2-1, VII, A^{VI} , will be interrupted between the contacts 12 and 13 (Fig. 6). Now, however, the lever N will

touch the contact 15, whereby the armature of the motor will be short circuited along the following route: A^V , I, armature of the motor A^{IV} , contact 13, lever N, contact 15, A^{VII} , contacts 8-7, IV, A^{VIII} , A^V . This short circuit acts like an electric brake and immediately stops the motor and keeps it in that condition as long as the connection between the conductors V and VI is not interrupted on the pendulum, in other words, as long as the magnet G remains excited, so that its armature maintains the connection between the contacts 7 and 8. When, however, the contacts on the pendulum are broken, the current will no longer flow through the magnet G, so that its armature will fall down, thereby opening the contacts 7-8 and 1-2, but closing the contacts 3-4 and 9-10. The circuit flows now from the positive pole over A^V and I to the armature of the motor and over A^{IV} , contact 13, lever N, contact 11, A^{III} , contacts 4-3, VII and A^{VI} to the negative pole of the source of electricity (Fig. 7). The motor will therefore start again and run on until it has brought the lever N again into the position shown in dotted lines in Fig. 3, *i. e.* until said lever N has left the contact 11 and has arrived at the contact 14. On this latter position of the lever N the motor will stop again, because the armature circuit will become short-circuited over A^V , I, armature of the motor A^{IV} , contact 13, lever N, contact 14, A^{VIII} , contacts 10-9, A^V (Fig. 4). The plates 16 and 17, which serve to make the connections between the contacts 9 and 10, and 7 and 8 respectively, are insulated as regards the armature g' of the electro-magnet G. The interrupter P, which acts in the same manner on the circuit, may serve for suddenly shutting off the steam from the engine and may be provided at any suitable place.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. In a marine governor, the combination of a throttle valve, an electric circuit including an electrically operated device for controlling said valve, a switch operated by a pendulum for closing said circuit, a second switch operated by a ball governor on the engine for closing said circuit and an electro-magnet adapted to close a shunt circuit in order to prevent the circuit operating the throttle valve when once closed from being opened again by the operation of either of said pendulum or governor controlling devices.

2. In a controlling apparatus for marine engines, the combination with the throttle valve of an electric motor provided with connections for opening and closing said valve, a circuit including a source of electricity, a switch in said circuit, a pendulum

for operating said switch, a second switch in
said circuit, a governor for operating said
switch, an electro-magnet, circuits arranged
so that when either of said switches are
5 closed, current will be supplied to said mag-
net and to the motor, a second electro-mag-
net, circuits and contacts operated by said
first named magnet for closing a circuit
through said second magnet, a shunt circuit
10 which is closed by said second magnet from
the source of electricity to the motor and a

switch operated by said valve controlling
mechanism for opening the circuit to the
motor when the valve is closed and for short
circuiting the armature of the motor.

15

In testimony whereof I affix my signature
in presence of two witnesses.

SANTO RUMOLINO.

Witnesses:

ALEXANDRO RIGHI,
ANGELO SOVERGINA.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."