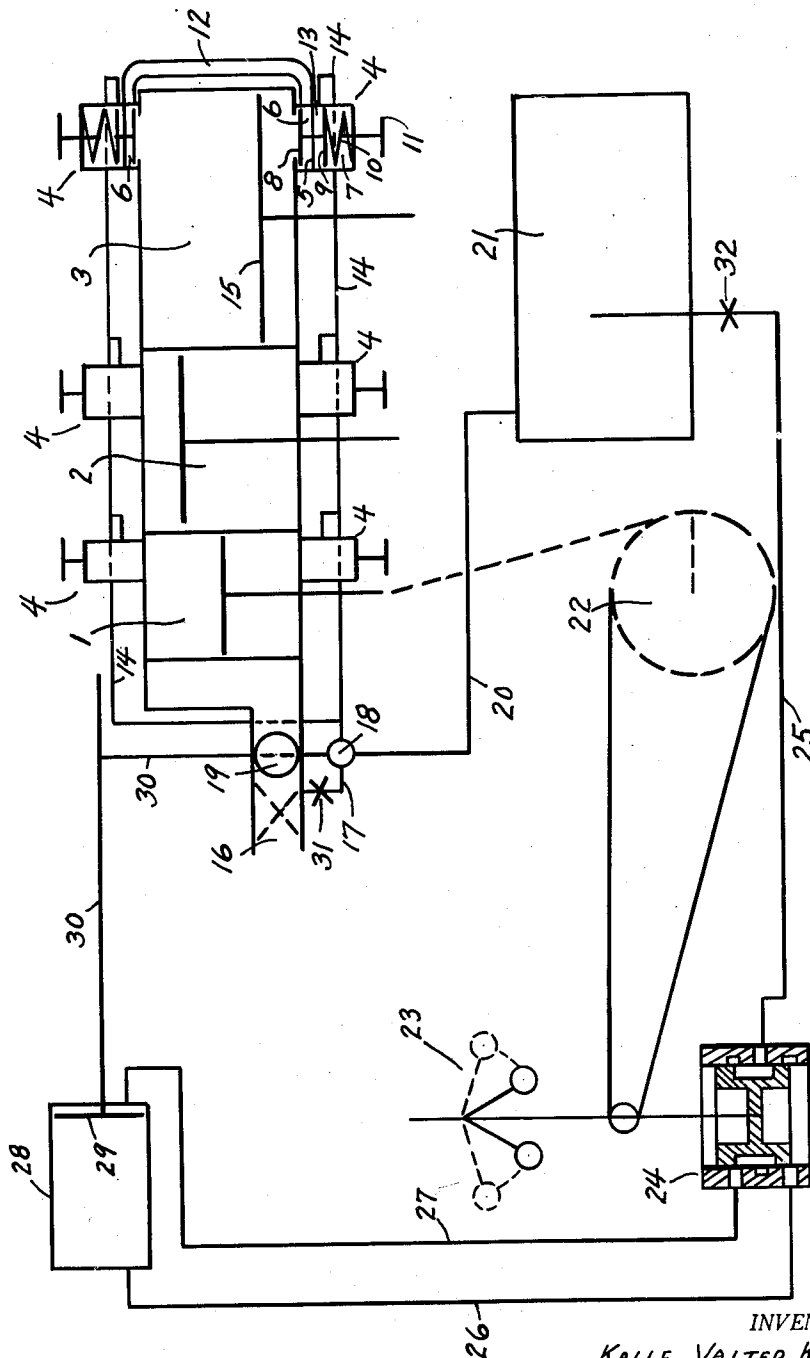


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METHOD AND MEANS FOR REGULATING
THE SPEED OF SHIPS' PROPELLERS
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METHOD AND MEANS FOR REGULATING
THE SPEED OF SHIPS' PROPELLERS

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This invention relates to a method of regulating the speed of ship's propellers through heavy sea waters and has for its object to provide a control mechanism by which the pressures on either side of the pistons of engine cylinders are equalized in regulation phase so as to control the speed of the propellers.

The invention will be more particularly described with reference to the accompanying drawing wherein for purpose of illustration only a presently preferred but non-limiting embodiment of the invention is set forth.

Referring to the drawing in detail, the numeral 1 designates the high pressure cylinder, 2 the medium pressure cylinder and 3 the low pressure cylinder of the steam engine both end faces of said cylinders being provided according to the invention with a valve 4 whose box is divided by means of a wall 5 into two compartments 6 and 7, of which the former accommodates a valve head 8 adapted to close the port leading to the cylinder and to be pressed into its closing position for instance by means of a spring 10 acting on a piston fixed to the other end of the stem of the valve head 8, the degree to which said valve is opened being regulated for instance by means of a screw 11 against which the piston in its extreme position rests. The compartment 6 is connected by means of a tube 12 to the corresponding compartment 6 of a valve 4 located at the other end of the cylinder. Into space 13 formed between the piston 9 and the partition wall 5 pressure can be introduced for instance by means of a tube 14 so as to overcome the tension of the spring 10, and the valve opens so that pressure is arranged to pass from the one side of the cylinder piston 15 through the tube 12 and through the valve located at the other end of the cylinder and opened similarly to and simultaneously with said first-mentioned valve to the other side of the piston 15, whereby the pressure on either side of the piston 15 in the cylinder is equalized, and operation ceases in the cylinder.

Pressure can be introduced into spaces 13 of the valves 4 arranged in the different cylinders for instance by a tube 17 leading from a main steam pipe 16 for instance through a three-way valve 18 which can be arranged to cooperate with for instance a storm valve 19 so as to introduce pressure into the spaces 13 when the storm valve 19 closes.

On turning the three-way valve into another position the pressures can be conducted from spaces 13 for instance through a tube 20 into a condenser 21 whereby the valves 4 are closed

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by the action of springs 10 and the steam engine operates in the normal manner.

The valves 4 can function at the same time as water exhaust valves.

The three-way valve 18 and the storm valve 19 can be controlled so as to correspond to sea waters by means of any suitable prior known speed regulating means and regulators operating according to the position of the ship. In the drawing is illustrated by way of example a controlling system in which a regulator 23 deriving its motion from an engine shaft 22 is, according to speed, adapted to control a slide device 24, which directs the condenser suction from a pipe 25 by way of pipe 26 or 27 either to the one side or the other side of the piston 29 operating in cylinder 28, whereby the piston operates in corresponding manner and closes or opens by means of levers 30 the storm valve and the three-way valve 18 connected thereto.

In heavy sea the ship's propeller is often lifted clear of the water and the speed of the shaft 22 rises whereby the speed regulator directs suction from the condenser 21 to the other side of the piston 29 in the cylinder 28, at which the piston moves and closes by means of the levers 30 the storm valve 19 and conducts pressure through the three-way valve 18 into the spaces 13, whereby all the valves 4 open simultaneously and the pressures in all the cylinders 1 to 3 are equalized and the rotation speed is prevented from rising. When the rotation speed drops the storm valve opens and the valves 4 close and the engine operates normally.

When the regulating device is not in use it can be disconnected from the engine by detaching the speed regulator and by closing the valves 31 and 32.

It is to be understood that the invention is not limited to the embodiment given as an example only for many constructional modifications can be made therein within the scope of the invention. So for instance, the system for directing the operation of the valves can differ from the one described. Also the valves can be operated by any suitable pressure other than that produced by steam, for instance liquid or gas.

I claim:

1. In a marine propulsion system, a cylinder, a piston in said cylinder, a conduit connecting the opposite ends of said cylinder, normally closed valve means connected in said conduit, a rotary element drivingly connected to said piston, and speed-responsive means on said rotary element, said speed-responsive means being arranged to

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open said valve means when the speed of the rotary element exceeds a predetermined value, whereby the pressure at the opposite ends of the cylinder will be equalized.

2. In a marine propulsion system, a cylinder, a piston in said cylinder, a conduit connecting the opposite ends of said cylinder, normally closed, fluid pressure-operated valve means connected in said conduit, a rotary element drivingly connected to said piston, speed-responsive means on said rotary element, a source of fluid pressure, a control cylinder arranged to operate said valve means, a control valve connected to said speed-responsive means, and conduit means connecting said source of fluid pressure to said control cylinder through said control valve.

3. In a marine propulsion system, a cylinder, a piston in said cylinder, respective valves at opposite ends of the cylinder, a conduit connecting said opposite ends and including said valves, a rotary element drivingly connected to said piston, and speed-responsive means on said rotary element and connected to said valves, said speed-responsive means being arranged to open said valves when the speed of the rotary element exceeds a predetermined value, whereby the pressure at the opposite ends of the cylinder will be equalized.

4. In a marine propulsion system, a main cylinder, a piston in said main cylinder, an engine shaft drivingly connected to said piston, a conduit connecting the opposite ends of said cylinder, normally closed valve means connected in said conduit, a control cylinder operatively connected to said valve means, a source of fluid pressure, a speed-responsive valve connected to said engine shaft, and conduit means connecting said source to said control cylinder through said speed-responsive valve, said speed-responsive valve being arranged to actuate said control cylinder when the speed of the engine shaft exceeds a predetermined value, whereby the pressure at the opposite ends of the first-named cylinder will be equalized.

5. In a marine propulsion system, a main cylinder, a steam supply conduit connected to said main cylinder, a normally open main valve in said steam supply conduit, a piston in said main cylinder, an engine shaft drivingly connected to said piston, conduit means connecting opposite ends of said main cylinder, normally closed auxiliary valve means included in said conduit means, and speed-responsive means connected to said engine shaft and arranged to simultaneously close said main valve and open said auxiliary valve means when the speed of the engine shaft rises above a predetermined value, thereby simultaneously shutting off the supply of steam to said

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main cylinder and equalizing the pressure in the opposite ends of the main cylinder.

6. In a marine propulsion system, a main cylinder, a steam supply conduit connected to said main cylinder, a normally open main valve in said steam supply conduit, a piston in said main cylinder, an engine shaft drivingly connected to said piston, conduit means connecting opposite ends of said main cylinder, normally closed auxiliary valve means included in said conduit means, speed-responsive means connected to said engine shaft, a fluid pressure source, a control cylinder operatively connected to said main control valve and said auxiliary valve means, a control valve, conduit means connecting said source to said control cylinder through said control valve, and means drivingly connecting said speed-responsive means to said control valve and arranged to simultaneously close the main valve and open the auxiliary valve means when the speed of the engine shaft rises above a predetermined value, thereby shutting off the supply of steam to said main cylinder and equalizing the pressure in the opposite ends of said main cylinder.

7. In a marine propulsion system, a main cylinder, a steam supply conduit connected to said main cylinder, a normally open main valve in said steam supply conduit, a piston in said main cylinder, an engine shaft drivingly connected to said piston, conduit means connecting opposite ends of said main cylinder, normally closed auxiliary valve means included in said conduit means, speed-responsive means connected to said engine shaft, a vacuum source, a control cylinder operatively connected to said main control valve and said auxiliary valve means, a control valve, conduit means connecting said source to said control cylinder through said control valve, and means drivingly connecting said speed-responsive means to said control valve and arranged to simultaneously close the main valve and open the auxiliary valve means when the speed of the engine shaft rises above a predetermined value, thereby shutting off the supply of steam to said main cylinder and equalizing the pressure in the opposite ends of said main cylinder.

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