Sept. 14, 1943. P. BEACROFT 2,329,450

MARINE ENGINE GOVERNOR

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Fig. 1.

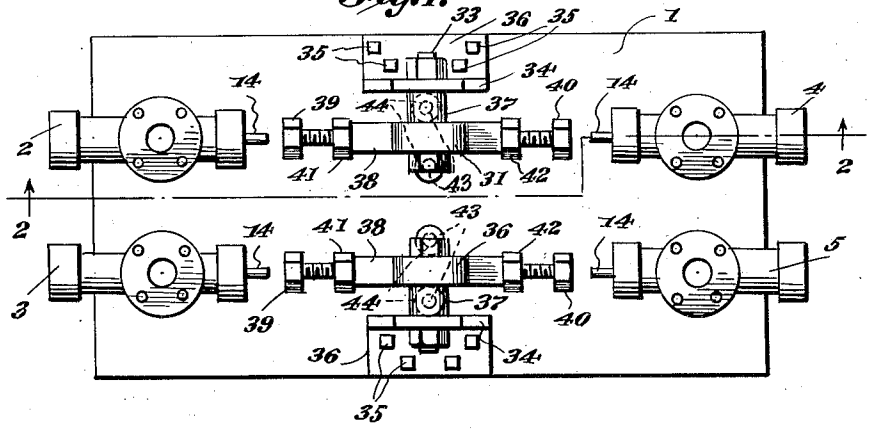


Fig. 2.

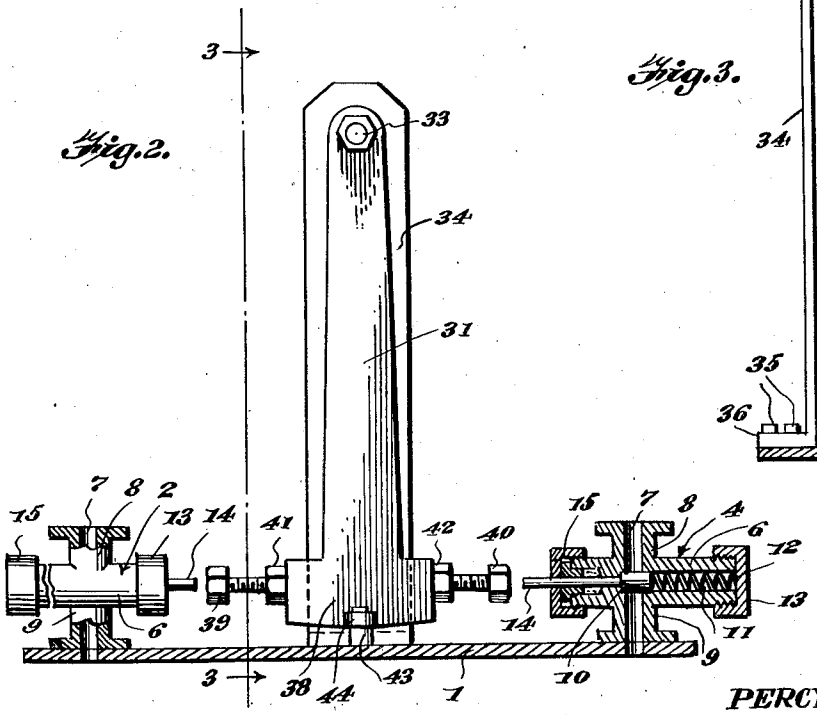
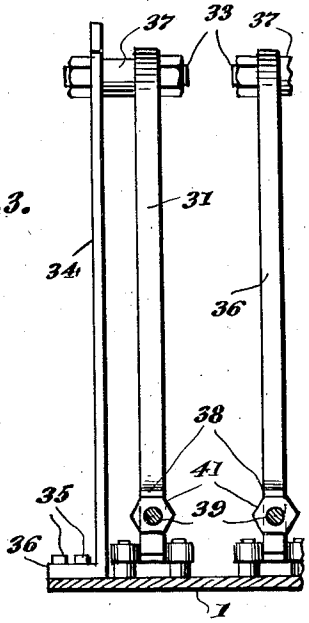


Fig. 3.



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Fig. 4.

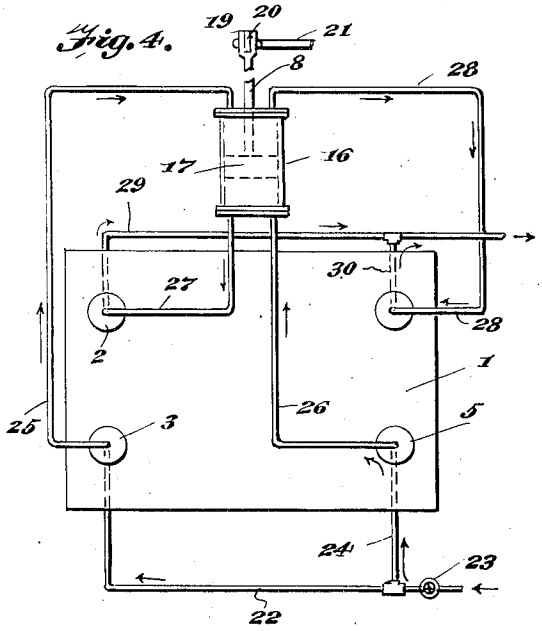


Fig. 5.

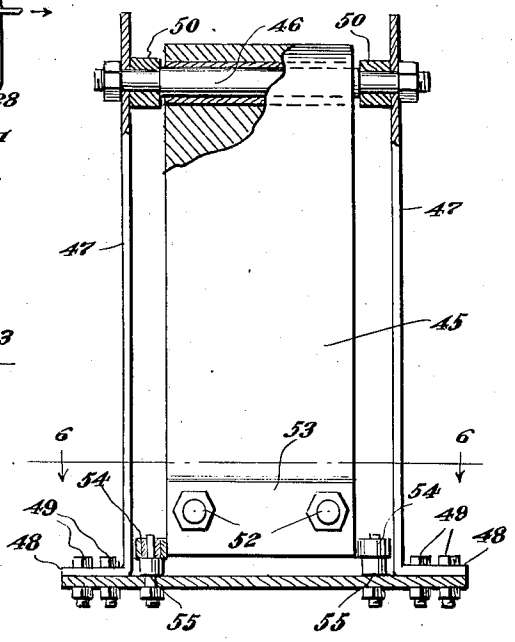
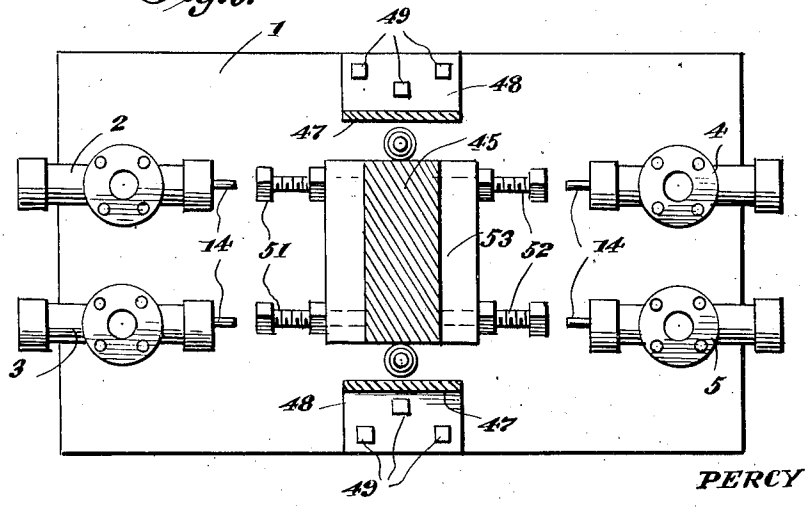


Fig. 6.



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MARINE ENGINE GOVERNOR

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Application May 27, 1942, Serial No. 444,705

12 Claims. (Cl. 137—159)

This invention relates to a governor for a marine engine. When a boat is caught in a storm and the sea becomes rough, the boat has rocking motion and the stern thereof will move upwardly as the bow moves downwardly. When the stern moves upwardly, the propeller or propellers often are exposed and the engine will then race at such speed that there is danger of the propeller spinning loose, or the propeller shaft may be twisted and broken. To overcome this danger, it is necessary to shut off the steam to the engine as the propeller moves out of the water and then turn on the steam as the propeller again enters the water.

This is often difficult to accomplish in proper timed relation to the movements of the boat and it is, therefore, one object of the invention to provide a governor of such construction that, as the boat rocks longitudinally and the propeller is exposed, the throttle will be automatically closed to shut off flow of steam to the engine and then reopened as the propeller enters the water.

Another object of the invention is to provide a governor including valves and a pendulum structure mounted between the valves, the pendulum being out of engagement with the valves when the boat is on substantially an even keel and movable into and out of engagement with the valves in response to vertical movement of the bow and stern of the boat during rough weather.

Another object is to provide a governor wherein the valves are mounted on a base in spaced relation to each other longitudinally thereof, the pendulum being mounted vertically over the base between the valves for swinging movement longitudinally of the base and thus permitted to swing longitudinally of a boat into and out of operative engagement with the valves when the governor is installed in a boat with its base extending parallel to the length of the keel.

Another object is to provide a governor of such construction that, as the pendulum swings in response to rocking of the boat, valves at one end of the base and controlling flow of steam through opposite ends of a cylinder, may be simultaneously opened as the pendulum swings toward said valves, and then closed as the pendulum swings away from the valves.

Another object of the invention is to provide an automatic throttle operating mechanism which is simple in construction, efficient in operation, and easy to install in connection with the throttle lever of an engine of conventional construction.

In the accompanying drawings:

Fig. 1 is a top plan view of the improved governor.

Fig. 2 is a longitudinal sectional view on the line 2—2 of Fig. 1.

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 2.

Fig. 4 is a diagrammatic view showing the improved governor installed for use.

Fig. 5 is a transverse sectional view of a modified form of governor.

Fig. 6 is a view on the line 6—6 of Fig. 5.

This governor has a base 1 formed of metal or other suitable material and carrying valves 2 and 3 near one end and similar valves 4 and 5 near its opposite end. The valves are of duplicate construction and each has a body 6 mounted on the base and formed with a steam passage 7 which extends through portions 8 and 9 to which the steam pipes are connected. A valve plunger 10 for blocking the steam passage 7 is slidably mounted in the chamber 11 of the valve body and is normally held in the closed or blocking position by a spring 12 held in place under compression by a cap or head 13 threaded upon the outer end of the body 6. The steam 14 of the valve plunger 10 projects from the inner end of the body 6 and passes through a packing gland 15 which prevents leakage of steam about the stem.

The valves 2 and 4 are exhaust valves and valves 3 and 5 are inlet valves and, by referring to Fig. 1, it will be seen that at each end of the base there is an inlet valve which is spaced from a companion exhaust valve transversely of the base. These valves control flow of steam through end portions of a cylinder 16 in which is mounted a piston 17 having a piston rod 18 which projects from one end of the cylinder and is provided at its outer end with a fork 19 for connection with the lever 20 of a throttle of conventional formation which may be opened and closed by moving the lever to turn a throttle shaft 21 or equivalent mechanism. A steam supply pipe 22 controlled by a master valve 23 is connected with one end of the passage 7 of the valve 3 and a branch pipe 24 leads from pipe 22 to the corresponding end of the passage 7 of valve 5. From these valves, pipes 25 and 26 of flexible material, lead to inlets at opposite ends of the cylinder 16 and from an inspection of Fig. 4, it will be readily seen that when the valve 3 is opened, the piston 17 will be moved to shift its rod 18 longitudinally in one direction while opening of valve 5 will deliver steam into the opposite end of the cylinder and effect movement of the piston and its stem in a reverse direction. When the rod is shifted longi-

tudinally in one direction, the throttle is opened and when the rod is moved longitudinally in an opposite direction, the throttle is closed. Pipes 27 and 28 connect opposite ends of the cylinder with the exhaust valves 2 and 4 so that exhaust steam may flow through the flexible pipes 27 and 28 to the exhaust valves for discharge through the exhaust pipe 29 and its branch 30. By this arrangement, the valves 2 and 3 may be opened and steam will be admitted to one end of the cylinder through pipe 25 to move the piston and its rod in one direction, and, as the piston approaches the other end of the cylinder, air or steam will be forced out of the cylinder through pipe 27 and into the exhaust pipe 29. When the valves 4 and 5 are opened, steam will be delivered to the cylinder through pipe 26 and steam or air discharged from the opposite end of the cylinder through pipe 28 and branch pipe 30 to the exhaust pipe 29. In both cases, steam is admitted to the cylinder at one end thereof to shift the piston and its rod longitudinally for adjustment of the throttle and, during each movement, air or steam will be discharged from the other end of the cylinder by the moving piston and movement of the piston in the cylinder will not be interfered with by accumulated air or steam in the cylinder.

The valves are to be automatically opened when the boat rocks and to accomplish this there has been provided a pendulum structure mounted over the base between the groups of valves. Referring to Figs. 1, 2 and 3, it will be seen that the pendulum structure consists of a pair of pendulums 31 and 32 which are disposed vertically and pivotally mounted at their upper ends by pivot pins or bolts 33 which pass through upper ends of standards or brackets 34. These brackets are disposed vertically midway the length of the base adjacent opposite side edges thereof where they are secured by fasteners such as bolts or screws passing through base flanges 36 of the brackets. Sleeves 37 hold the pendulums spaced from the brackets so that they may swing freely without striking the brackets and the lower end of each pendulum is formed with a cross head 38 which projects from opposite sides of the pendulum, as shown in Fig. 2, and is formed at its ends with threaded sockets to receive screws 39 and 40 which are held in adjusted positions by locking bolts 41 and 42. It will be assumed that the base is mounted in a boat over the keel, longitudinally thereof, with the valves 4 and 5 extending in the direction of the bow and valves 2 and 3 toward the stern of the boat. As the bow dips downwardly and the stern rises upwardly, the pendulums will be swung forwardly to open the valves 4 and 5 by engagement of the striker screws 40 with the stems 14 of these valves. Steam will then be admitted to one end of the cylinder through pipe 26 and, as the piston 17 is moved in the cylinder, air or steam will be discharged through the pipe 28. The throttle valve 20 will be moved to close the throttle and shut off the engine to prevent racing of the propeller shaft while the propeller is out of the water. As the stern settles, the pendulums will swing aft to open the valves 2 and 3 and the throttle will be reopened by movement of the piston and its rod by steam entering the cylinder through the pipe 25 and during such movement of the pendulums, air will escape from the cylinder through the pipe 27. Eventually, the pendulums will resume their vertical position shown in Fig. 2, in which all of the striker screws are out of contact with stems of the valves and the springs 12 will hold the plungers 10 in closing relation to passages 7 of the valves. By adjustment of the screws they may be normally spaced a predetermined distance from the valves and opening of the valves permitted only after the pendulums have swung a predetermined distance. Posts 43 extend upwardly from the base and carry rollers 44 for engaging opposite sides faces of the cross heads at lower ends of the pendulums and guiding swinging movement of the pendulums into and out of engagement with stems of the valves.

Instead of providing two pendulums, a single pendulum may be employed. Such a construction is illustrated in Figs. 5 and 6 of the drawings, and, referring to these figures, it will be seen that the pendulum 45 is mounted for swinging movement on a shaft 46 carried by and extending between upper ends of brackets 47. These brackets correspond to the brackets or standards 34 and have feet 48 at their lower ends secured on the base by bolts 49. This pendulum is held spaced from the standards or brackets by sleeves 50 and is of such width that the striker screws 51 and 52 which project from opposite ends of the cross head 53 at its lower end, may make contact with the stem of the valves 2 and 3 or valves 4 and 5, according to the direction in which the pendulum swings during rocking of the boat. Swinging movement of the pendulum is guided by rollers 54 mounted on posts 55 carried by the base between the pendulum and the lower ends of the brackets. The operation of this embodiment of the invention is the same as previously described, except that each pair of valves are opened by action of a single pendulum instead of by a pair of pendulums.

Having thus described the invention, what is claimed is:

1. In a governor for marine engines, the combination with a boat of a base mounted on the boat and extending longitudinally thereof, members carried by said base in spaced relation to each other longitudinally thereof for controlling flow of fluid to and from means for opening and closing the throttle of an engine as the boat rocks longitudinally, and an actuator for said members movably mounted over the base between said members and movable by gravity longitudinally of the base and the boat into and out of position for actuating the members in response to longitudinal rocking of the boat.

2. In a governor for marine engines, the combination with a boat of a base mounted on the boat and extending longitudinally thereof, valves carried by said base and spaced from each other longitudinally thereof, and a pendulum mounted in vertical position over the base between said valves for swinging movement by gravity longitudinally of the base and the boat into and out of engagement with the valves to adjust the valves in response to longitudinal rocking of the boat.

3. In a governor for marine engines, the combination with a boat of a base mounted on the boat and extending longitudinally thereof, valves carried by said base in spaced relation to each other longitudinally thereof and having stems projecting longitudinally of the base, a standard extending upwardly from the base intermediate said valves, and a pendulum pivoted at its upper end to the standard and disposed vertically between the valves and having swinging movement toward and away from the valves in response

to longitudinal rocking of the boat, and screws extending from opposite sides of the lower end of the pendulum in position to engage the stems and effect opening and closing of the valves as the pendulum swings longitudinally of the base in response to longitudinal rocking of the boat.

4. In a governor for marine engines, the combination with a boat of a base mounted on the boat and extending longitudinally thereof, valves carried by said base, the valves being arranged in pairs disposed at opposite ends of the base, one valve of each pair being a feed valve for a fluid actuated throttle opening and closing device and the other valve being an exhaust valve for the throttle opening and closing device, supporting means mounted in an upright position upon the base intermediate the length thereof and disposed between the pairs of valves, and lever means pivotally carried by the supporting means and movable by gravity in response to longitudinal rocking of the boat into and out of position to effect opening and closing of the valves.

5. In a governor for marine engines, the combination with a boat of a base mounted on the boat and extending longitudinally thereof, valves carried by said base, the valves being arranged in pairs disposed at opposite ends of the base, one valve of each pair being a feed valve for a fluid actuated throttle opening and closing device and the other valve being an exhaust valve for the throttle opening and closing device, standards carried by said base intermediate the length thereof and extending upwardly therefrom in spaced relation to each other transversely of the base, and a pendulum pivoted at its upper end between the standards for swinging movement longitudinally of the base and having its free lower end in position to engage and operate the valves as the pendulum swings by gravity toward and away from the pairs of valves in response to longitudinal rocking of the boat.

6. In a governor for marine engines, the combination with a boat of a base mounted on the boat and extending longitudinally thereof, valves carried by said base, the valves being arranged in pairs located at opposite ends of the base, one valve of each pair being a feed valve for a fluid actuated throttle opening and closing device, and the other valve being an exhaust valve for the throttle opening and closing device, standards carried by said base and extending upwardly therefrom in spaced relation to each other transversely of the base and located midway the length thereof, and a pendulum pivoted at its upper end between the standards for swinging movement longitudinally of the base and having a cross head at its lower end extending from opposite sides of the pendulum for engaging and operating the valves as the pendulum swings about its pivot toward and away from the pairs of valves in response to longitudinal rocking of the boat.

7. In a governor for marine engines, the combination with a boat of a base mounted on the boat and extending longitudinally thereof, valves carried by said base, the valves being arranged in pairs located at opposite ends of the base, one valve of each pair being a feed valve for a fluid actuated throttle opening and closing device, and the other valve being an exhaust valve for the throttle opening and closing device, standards carried by said base and extending upwardly therefrom in spaced relation to each other transversely of the base and located midway the length thereof, a pendulum pivoted at its upper end between the standards for swinging movement longitudinally of the base and having a cross head at its lower end extending from opposite sides of the pendulum toward the valves, and screws carried by the cross head and projecting from opposite ends thereof and constituting adjustable strikers for engaging and operating the valves as the pendulum swings about its pivot in response to longitudinal rocking of the boat.

8. In a governor for marine engines, the combination with a boat of a base mounted on the boat and extending longitudinally thereof, valves carried by said base, the valves being arranged in pairs located at opposite ends of the base, one valve of each pair being a feed valve for a fluid actuated throttle opening and closing device and the other valve being an exhaust valve for the throttle opening and closing device, standards carried by said base and extending upwardly therefrom in spaced relation to each other transversely of the base and located midway the length thereof, a pendulum pivoted at its upper end between the standard for swinging movement longitudinally of the base and having its free lower end in position to engage and operate the valves as the pendulum swings toward and away from the pairs of valves in response to longitudinal rocking of the boat, and rollers carried by the base for engaging side faces of the lower end of the pendulum and guiding swinging movement of the pendulum.

9. In a governor for marine engines, the combination with a boat of a base mounted on the boat and extending longitudinally thereof, valves carried by said base and arranged in pairs spaced from each other longitudinally of the base, the valves of each pair being spaced from each other transversely of the base towards the other pair of valves and having stems extending longitudinally of the base, one valve of each pair being a feed valve and the other valve being an exhaust valve, standards carried by the base midway the length thereof and spaced from each other transversely of the base, a pivot bar extending between and carried by upper ends of the standards, and a pendulum pivoted at its upper end on the pivot bar for swinging movement longitudinally of the base between the pairs of valves with its lower end in position to engage the stems of the valves and simultaneously operate the valves of each pair as the pendulum swings about the pivot bar in response to longitudinal rocking of the boat.

10. In a governor for marine engines, the combination with a boat of a base mounted on the boat and extending longitudinally thereof, valves carried by said base and arranged in pairs spaced from each other longitudinally of the base, the valves of each pair being spaced from each other transversely of the base towards the other pair of valves and having stems extending longitudinally of the base, one valve of each pair being a feed valve and the other valve being an exhaust valve, standards carried by the base midway the length thereof and spaced from each other transversely of the base, a pivot bar extending between and carried by upper ends of the standards, and a pendulum pivoted at its upper end on the pivot bar for swinging movement longitudinally of the bar toward and away from the pairs of valves and having a cross head at its lower end of a width adapting it to engage and operate the valves of each pair as the pendu-

lum swings about the pivot bar in response to longitudinal rocking of the boat.

11. In a governor for marine engines, the combination with a boat of a base mounted on the boat and extending longitudinally thereof, valves carried by said base and arranged in pairs spaced from each other longitudinally of the base, the valves of each pair being spaced from each other transversely of the base towards the other pair of valves and having stems extending longitudinally of the base, one valve of each pair being a feed valve and the other valve being an exhaust valve, standards carried by the base midway the length thereof and spaced from each other transversely of the base, a pivot bar extending between and carried by upper ends of the standards, a pendulum pivoted at its upper end on the pivot bar for swinging movement longitudinally of the base as the boat rocks longitudinally and having its lower end of a width adapting it to extend in bridging relation to and engage a pair of valves, and rollers carried by the base for engaging side faces of the lower end of the pendulum and guiding the same into and out of engagement with the valves to effect opening and closing of the valves as the pendulum swings about the pivot bar longitudinally of the base in response to longitudinal rocking of the boat.

12. In a governor for marine engines, the combination with a boat of a base mounted on the boat and extending longitudinally thereof, valves carried by said base and arranged in pairs spaced from each other longitudinally of the base, the valves of each pair being spaced from each other transversely of the base towards the other pair of valves and having stems extending longitudinally of the base, one valve of each pair being a feed valve and the other valve being an exhaust valve, standards carried by the base between the pairs of valves and spaced from each other transversely of the base, a pivot bar extending between and carried by upper ends of the standards, a pendulum pivoted at its upper end on the pivot bar for swinging movement longitudinally of the base toward and away from the pairs of valves as the boat rocks longitudinally and having a cross head at its lower end projecting from opposite sides of the pendulum and of a width to bridge a pair of valves and screws carried by opposite ends of the cross head and constituting adjustable strikers for engaging stems of the valves and simultaneously effecting opening and closing of pairs of valves as the pendulum swings longitudinally of the base about its pivot bar in response to longitudinal rocking of the boat.

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