

No. 850,473.

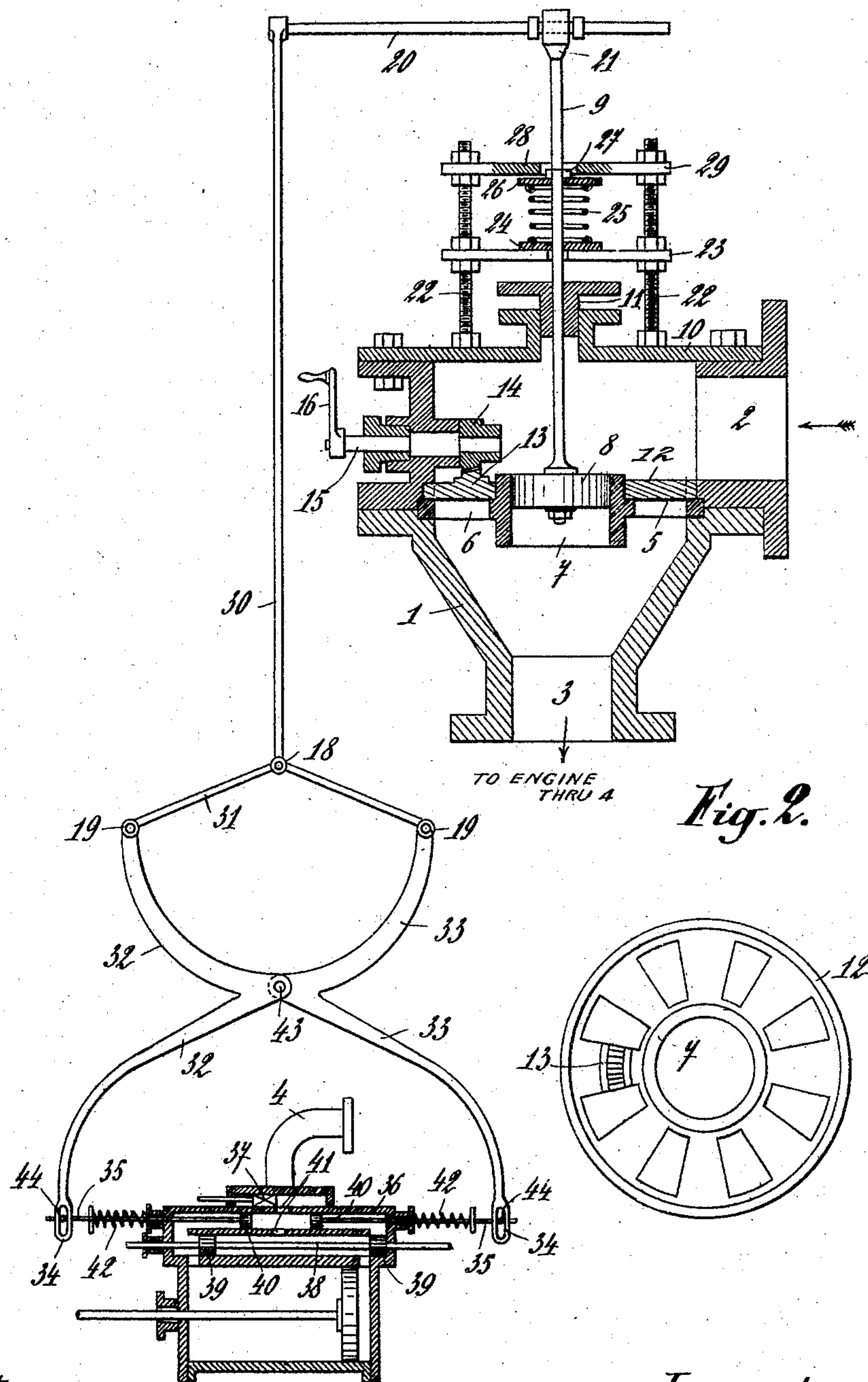
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GOVERNING DEVICE FOR MARINE ENGINES.

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Fig. 1.



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GOVERNING DEVICE FOR MARINE ENGINES.

No. 850,473.

Specification of Letters Patent.

Patented April 16, 1907.

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To all whom it may concern:

Be it known that I, WILHELMUS JOHANNES HENDRICUS FRESEN, a subject of Holland, residing at Brussels, in the Kingdom of Belgium, have invented new and useful Improvements in Governing Devices for Marine and Like Engines, of which the following is a specification.

This invention has for its object means for governing marine engines. As is well known, the governing of such engines presents especially great difficulties by reason of the large and sudden variations in the work to which the engines are liable to be subjected according as consequent upon the motion of the vessel the screw is under or out of the water. The greater number of governing means hitherto employed have proved to be inefficacious, on the one hand, owing to the fact that their action is not instantaneous, while, on the other hand, the economy which they effect in the steam consumption is very small. These known means generally act, in fact, upon the steam admission in order to entirely cut off or partially throttle the admission of the steam to the distributing-gear when a considerable diminution of the work required takes place; but as in these conditions the quantity of steam comprised between the governing means arranged on the admission-pipe and the "distributing-gear," properly so called, is still sufficient to produce one or two admissions to the cylinder it follows in the first place that the steam contained in this way in the supply-pipe will not only be wasted, but will greatly interfere with the promptness of the governing action, since no matter how promptly the throttle is closed the steam between the throttle and the engine would be effective to accelerate the latter very injuriously.

The present invention has for its object to obviate these defects, and consequently to obtain means permitting of acting directly upon the steam admitted to the cylinder in such a manner as to avoid any useless consumption of steam in case a sudden and considerable diminution of the work required should occur.

With this object in view the invention consists more particularly in the special combination of parts, as hereinafter fully described, and pointed out in the appended claims.

The accompanying drawings show, by way of example, means adapted for carrying the invention into practice.

Figure 1 is a vertical section of a governor and shows one arrangement which may be adopted for causing said governor to act in accordance with the present method directly upon the admission of steam to the cylinder, which is shown diagrammatically in section and at a reduced scale. Fig. 2 is a detail view of the governor.

As shown in Fig. 1, the governor comprises a chamber 1, provided with a steam-supply connection 2, to which is connected the pipe coming from the boiler, and a connection 3, to which is connected the piping 4, leading to the steam-supply of the engines. In the chamber 1 of the governor is arranged a plate 5, provided with passages 6 and forming at the center a kind of cylinder 7, in which a piston 8, rigid with a rod 9, passing through the cover 10 of the apparatus and also through a stuffing-box 11, is adapted for displacement. Above the plate 5 is arranged a circular slide-valve 12, the rotation of which permits of obturating to a greater or less extent the passages 6, formed in the plate 5. This circular slide-valve 12 is provided with a rack portion 13, in which a small pinion 14 is adapted to mesh. This pinion rotates with the spindle 15, provided outside the apparatus with a lever 16, adapted to be acted upon manually, so as to control the position of the slide-valve 12 in such a manner as to secure the supply of steam to the cylinder of the engine which is necessary for the maximum working of said engine.

Upon the cover 10 of the governor are arranged two vertical screw-threaded rods 22, carrying a cross-piece 23, adjustable in position, through which the piston-rod 9 passes freely. Upon this cross-piece 23 bears a washer 24, to which is attached a spring 25, surrounding the piston-rod 9 and carrying at its upper extremity a second washer 26, the position of which upon the piston-rod 9 is regulated by means of a nut 27. This nut 27 is adapted to engage in a central aperture 28 of a second cross-piece 29, which is also mounted in an adjustable manner upon the columns 22 and against which the washer 26 bears when it tends to lift the piston-rod 9 under the influence of the spring 25. This cross-piece 29 consequently limits the ascending movement of the rod 9. This spring 25 serves to balance the weight of the piston and of the other parts solid with the piston and acts consequently to lift the piston in the cylinder 7.

The horizontal rod 20, to which the piston-rod 9 is attached at 21, acts at its extremity upon a lever or rod 30, connected at 18 to two rods 31, pivotally connected at 19 with two levers 32 and 33, rocking on a trunnion 43. The ends 34 of said levers 32 33 act by means of slides upon suitable pivots 44, carried by rods 35, entering a special conduit 36, arranged in the distribution-chamber of the engines between the expansion-valve 37 and the conduit 38, in which the distributing-valve 39 acts. The rods 35 terminate in the conduit 36 in obturating-pistons or in valves or other obturators or closing members 40 of suitable kind acting in inverse directions to each other and capable when brought together of obturating to a greater or less extent (or even almost completely) the ports 41, through which the steam passes from the expansion-valve 37 into the distributing-conduit 36. The rods 35 may be provided with springs 42, which tend to bring them back into their original position after each operation.

The device above described operates in the following manner: When starting the engine, the lever 16 is manually operated so as to give to the slide-valve 12 the necessary position in order to secure through the apertures 6 a supply of steam corresponding to the maximum efficiency of the engine according to the boiler-pressure. This regulation must only be varied if an important variation of pressure occurs in the boiler. The steam thus admitted passes from the pipe 2 through the apertures 6 into the pipe 3, and hence into the pipe 4, supplying the steam to the cylinder of the engine. The steam passing through the pipe 2 acts upon the upper face of the piston 8 and causes a depression to take place in the cylinder 7 under said piston 8, owing to the suction in said cylinder 7. As a result the piston 8 immediately moves downward in the cylinder 7, putting simultaneously the spring 25 under compression through the washer 26, carried by the piston-rod 9; but, as is obvious, the suction under the piston 8 varies according to the work of the engine. Indeed, as the work required from the engine increases the steam flows more and more slowly through the pipe 3, and consequently the counter pressure in said pipe tends to balance the pressure in the pipe 2. On the contrary, if the work required from the engine diminishes the steam tends to flow more and more rapidly through the pipe 3, and the suction in the cylinder 7 under the piston 8 tends to increase; but to each movement of the piston 8 corresponds a given compression of the spring 25 in such a manner that the more the suction under the piston tends to move said piston downward in the cylinder 7 the more the compression of the spring 25 tends to return said piston to its original position. When the apparatus is

conveniently regulated, the piston 8 rests under the normal working of the engine in a mean position in the cylinder 7 and is maintained in said position, on the one hand, by the pressure of steam acting upon its upper face, and, on the other hand, by the action of the spring 25 balancing the action of said pressure. In this position of the piston 8 the levers 32 33 secure to the closing members 40 a position nearer to the ports 41 than that shown on the drawings, although said ports remain open for the inlet of the steam into the steam-chamber 38. If then a considerable and sudden diminution of pressure takes place in the pipe 3 4 as a result, for example, of the screw leaving the water and of a tendency of the engine to race, the piston 8 descends to a greater extent and the washer 26 compresses more fully the spring 25. As a result the piston-rod 9 displaces the rod 20. This latter in descending acts by means of the rod 30 upon the pivot 18 of the links or rods 31, which push the upper part of the levers 32 33 apart from one another. The slides 34 at the other ends of the levers 32 33 are consequently brought together and acting upon the pivots 44 cause the closing members 40 to partially or completely obturate the ports 41 through which the steam has access from the expansion-valve 37 to the distributing-valve chamber 38. The admission is accordingly instantaneously interrupted without there being any danger, as was previously the case, of the subsequent admission into the cylinder of the volume of steam still contained in the conduits between the "governor," properly so called, and the distributing-gear. When the cause of the abnormal operation of the engine has disappeared, the piston 8 is raised under the action of the spring 25, as the action of the steam-pressure is the same on the two faces of the piston 8 and as said spring only tends to lift said piston according to the compression to which it has been subjected when the piston has moved downward. The piston 8, the piston-rod 9, and the rods 20 and 30 are consequently returned to the original or mean position. The lower ends of the levers 32 and 33 are removed from one another, and the closing members 40 again disclose the inlet-ports 41, this movement being further facilitated by the action of the springs 42 acting on the rods 35 of said closing members.

In the drawings the apparatus is in the operative position—that is to say, no pressure exists in the pipes. When the pressure acts in the governor, the piston 8 descends in its mean position, in which the obturators or closing members 40 approach the ports 41 without, however, covering them, this taking place, as already explained, only when the ship's screw leaves the water. At this moment the obturation of the orifices 41 may be

almost complete without, however, being actually so. As a matter of fact it is essential that there should always be some small escape of steam.

5 When the engine is working normally, the normal variations of the pressure beneath the piston 8 do not exert any influence upon the distribution, owing to the existence of a certain amount of play between the articu-
10 lations of the mechanical parts.

Having thus described my invention, what I claim is—

1. In combination with the steam-distributing gear, the steam-distribution chamber
15 and the steam-supplying pipe of a marine engine, closing members independent of the distributing-gear properly so called, said closing members being located in the steam-distribution chamber and a governor arranged
20 in the steam-supplying pipe of the engine, said governor acting to partially or totally close the steam-passage to the distributing-gear by means of the closing members when the engine tends to race, substantially as de-
25 scribed.

2. In combination with the cylinder, the expansion slide-valve, the distributing slide-valve and the steam-supplying pipe of a marine engine, closing members located be-
30 tween the expansion slide-valve and the distributing slide-valve and a governor arranged in the steam-supplying pipe and acting on said closing members to partially or totally close the steam-passage between the expansion-valve and the distributing-valve when
35 the engine tends to race substantially as described.

3. In combination with the cylinder the expansion slide-valve, the distributing slide-

valve and the steam-supplying pipe of a ma- 40
rine engine, closing members located between the expansion slide-valve and the distribut-
ing slide-valve, a governor comprising a pis-
ton, a cylinder open at both ends, arranged
in the steam-supplying pipe and in which cyl- 45
inder said piston is adapted to move, a spring
tending to lift said piston and a piston-rod
passing out of the steam-supplying pipe and
a suitable transmission connecting said pis-
ton-rod to the closing members substantially 50
as described and for the purpose set forth.

4. In combination with the cylinder, the expansion slide-valve the distributing slide-
valve and the steam-supplying pipe of a ma-
rine engine, closing members located between 55
the expansion slide-valve and the distribut-
ing slide-valve, rods for actuating said closing
members, the said rods extending out of the
steam-distribution chamber, a governor, the
action of which depends upon the variation 60
of the steam-pressure in the steam-supplying
pipe, a rod moved by said governor and two
rocking levers acted upon by said governor
and moving the rods of the closing members
to close the passage of the steam between the 65
expansion slide-valve and the distributing
slide-valve when the governor is moved by
the variations of pressure in the steam-sup-
plying pipe, substantially as described and
for the purpose set forth. 70

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

WILHELMUS JOHANNES HENDRICUS FRESSEN.

Witnesses:

GEORGE BEDE,
GREGORY PHELAN.