

March 7, 1944.

H. KIESER

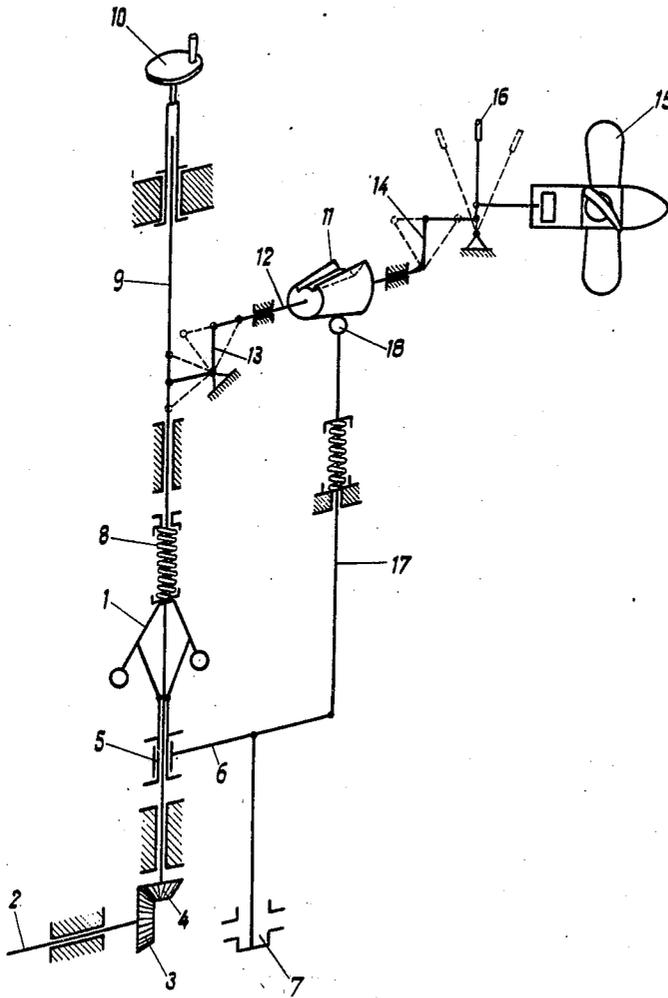
2,343,378

GOVERNING DEVICE FOR ENGINES ESPECIALLY FOR THE
DRIVE OF SHIP SCREWS WITH VARIABLE PITCH

Filed Dec. 6, 1940

2 Sheets-Sheet 1

FIG. 1



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2 Sheets-Sheet 2

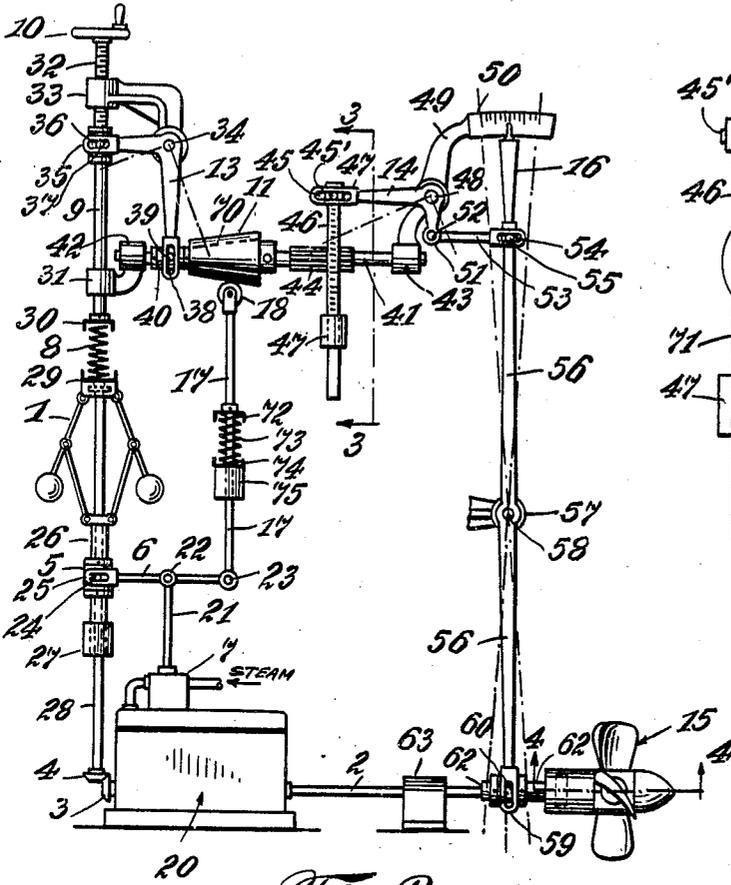


Fig. 2.

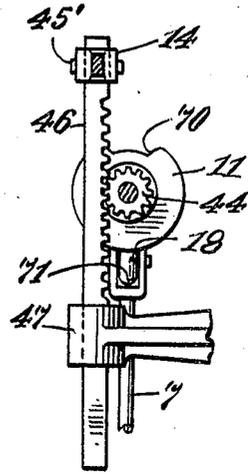


Fig. 3.

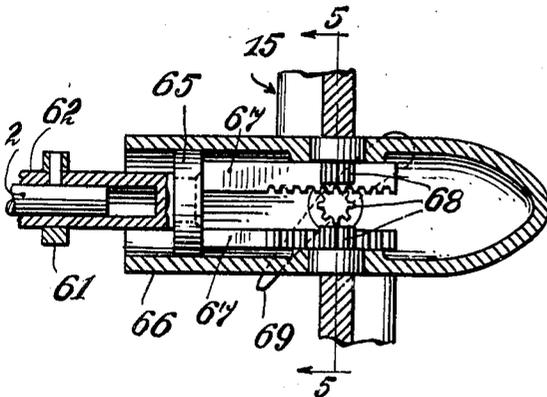


Fig. 4.

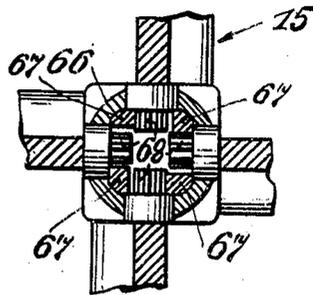


Fig. 5.

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UNITED STATES PATENT OFFICE

2,343,378

GOVERNING DEVICE FOR ENGINES, ESPECIALLY FOR THE DRIVE OF SHIP SCREWS WITH VARIABLE PITCH

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Application December 6, 1940, Serial No. 368,892
In Germany October 9, 1939

1 Claim. (Cl. 170—135.6)

This invention relates to governing devices for engines for the driving of ship's screws with variable pitch, and consists essentially in the provision of an additional control cam, besides the usual centrifugal governor, the action of which cam depends upon the variation of the pitch of the ship's screw and at the same time upon the speed of the engine. This cam is in the form of a drum, the shape of which is determined by protracting upon a cylinder the necessary adjustment for the stroke of the speed governor operated steam inlet or control valve in an axial direction at different speed settings of the governor and in a circumferential direction at the different pitches of the propeller blades. Such a drum is moved in an axial direction by the governor speed setting mechanism and rotated about its axis by the propeller pitch control mechanism. Thus the governor control of the steam inlet valve is adjusted or corrected by the drum in accordance with the speed setting of the governor and the pitch of the propeller blades in order to provide better speed regulation of the engine.

The invention will be more fully described hereinafter, embodiments shown in the drawings, and will be finally pointed out in the claim.

In the accompanying drawings—

Fig. 1 is a diagrammatic view of an embodiment of my invention;

Fig. 2 shows an embodiment of my invention in a mechanical manner, parts also being diagrammatic;

Fig. 3 is an enlarged section taken on line 3—3 of Fig. 2;

Fig. 4 is an enlarged section on line 4—4 of Fig. 2, and

Fig. 5 is a cross section taken on line 5—5 of Fig. 4.

Similar characters of reference indicate corresponding parts.

Referring to the drawings, the known and usual governor 1 is driven by an engine shaft 2, by means of a pair of bevel gears 3 and 4. A governor sleeve 5 has a lever 6 connected therewith which through link 21 actuates a control or steam inlet valve 7 of a steam engine 20. A spindle 9 has a hand wheel 10, which adjusts the speed by pressing a spring 8 upon the governor 1. A cam drum 11 on a shaft 12 is actuated in an axial direction by a lever 13 and is rotated by a lever 14. The lever 13 is connected with the spindle 9, and the lever 14 is connected with a device for changing the pitch of the screw 15, that is, the hand lever 16. A roller 18 on a rod

17 is pressed by a spring against the surface of the drum, the other end of the rod 17 being connected with the free end of the lever 6. Thus, the position of the valve 7 depends not alone upon the position of the governor, which in turn depends upon the speed of the engine, but also upon the pitch of the ship's screw.

The shape of the drum 11 is determined by protracting upon a cylinder the necessary adjustment for the stroke of the speed governor operated steam inlet or control valve in an axial direction at the different speed settings of the governor and in a circumferential direction at the different pitches of the propeller blades. The drum 11 is moved in an axial direction by the governor speed setting mechanism and rotated about its axis by the propeller pitch control mechanism. Thus the governor control of the steam inlet valve is adjusted or corrected in accordance with the speed setting of the governor and the pitch of the propeller blades in order to provide better speed regulation of the engine.

The invention is also applicable to bladewheel propellers having oscillating blades of the Voith-Schneider type.

In referring to Figs. 2 to 5, there is shown the mechanical parts utilized to carry out my invention. Any suitable engine indicated generally by 20 has a control valve 7 on the top thereof which is supplied with steam as indicated by the arrow and the word "steam" and which steam enters the valves of the engine 20 in a manner well known. The control valve 7 which controls the entrance of the steam into the engine 20 has a vertical rod 21 which is pivoted at 22 to the rod 6. This rod 6 at one of its ends is pivoted at 23 to the rod 17. The other end of the rod 6 has an elongated opening 24 through which passes a pin 25 of the sleeve 5. The sleeve 5 is attached to the sleeve 26 of the governor 1. The sleeve 26 is supported by the bearing 27 and encloses the shaft 27 which on its lower end has a bevel gear 4 meshing with the bevel gear 3 on the shaft 2 of the engine 20. The governor 1 has on its upper end a cup-shaped member 29 in which rests the lower end of the spring 8. The upper end of the spring 8 rests against a cup-shaped member 30 which is secured to the stationary rod 9 which is supported in the bearing 31. The threaded part 32 of the spindle 9 engages an interior threaded bracket 33 which in turn at 34 pivotally supports the elbow lever 13. One end 35 of the elbow lever is provided with a slot 36 which passes the pin 37. The other free end of the elbow lever 13 has a similar slot 38 en-

gaged by the pin 39 which pin is fixed to a sleeve 40 of the shaft 41.

This shaft 41 is supported at one end by the bearing 42 and at its other end by the bearing 43. The shaft has secured thereto an elongated pinion 44. This pinion 44 is in engagement with the vertical rack 46, the lower end of which is guided by a bearing 47 and the upper end of the rack 46 has a pin 45¹ engaging a slot 45 to one end 47 of the elbow lever 14. This elbow lever is pivotally supported at 48 to a bracket 49 supported by the bearing 43 which bracket 49 has an extension upon which a scale 50 is shown. The elbow lever 14 has its other end 51 pivotally connected at 52 with a rod 53 which has its other end provided with a slotted portion 54 engaged by a pin 55, the pin 55 being on the lever 56 operated by the handle 16. This lever 56 is pivotally supported on a stationary bracket 57 at 58 and the lower end of this lever 56 has a slotted end 59 engaged by a pin 60, which pin 60 is part of a slidable sleeve 62. The sleeve 62 slides upon the shaft 2 longitudinally, which shaft is supported by the bearing 63. The free end of the shaft 2 engages the sleeve 62 as shown in detail in Fig. 4 and is secured to a disc 65 within a propeller housing 66. On the disc 65 there are attached four like racks 67 each of which has its teeth engaging the corresponding pinion 68, one pinion 68 being for each propeller blade and suitably secured to the shaft thereof. The propeller is generally indicated by 15. By the movement of the racks 67 the blades of the propeller may be moved 45° each way from the position of the blade 69 shown in Fig. 4. This form of connection is only one of numerous forms that may be used and variations may be made therein, as is known. Returning to the shaft 41, and disposed between the slotted end 38 and the elongated pinion 44 the impulse member 11 is secured upon the shaft 41. This impulse member 11 has a cutout portion 70 as shown in Fig. 3. The surface of the impulse member 11 is engaged by the roller 18 which is supported by a rod 17, the lower end of which has a cup 72 against which the spring 73 presses, the other end of the spring resting upon a bearing 75 through which cup 74 and bearing 75, the rod 17 passes, the lower end of which rod 17 is pivotally engaged at 23 with the rod 6. The roller 18 is shown diagrammatically in Fig. 1, as in spherical form, and in Fig. 3, the roller is shown as curved portion 71 to enable the roller to ride upon the exterior surface of the impulse member 11 and eventually enter recess 70 and

ride through the same and out of the same as the case may be, in the event the parts are so adjusted to permit a complete rotation of the impulse member.

5 The essence of the structure shown in Fig. 2 consists in having the impulse member 11 capable of being longitudinally moved by means of the hand wheel 10, and bell crank 13, and the impulse member 11 is capable of being rotated by 10 means of the lever 56 and link 53 and bell crank 14, and rack 46 and pinion 44. Thus by the longitudinal and rotatable adjustment of the impulse member 11, the roller 18 is correspondingly adjusted in position and in consequence the steam 15 valve 7 is controlled thereby.

From the foregoing it is believed that the construction, operation and advantages of my invention may be readily understood by those skilled in the art without further description, it 20 being borne in mind that numerous changes may be made in the details disclosed without departing from the spirit of the invention as set out in the following claim.

I claim:

25 In a governing device for a steam engine having an engine shaft, a steam control valve for varying the steam supply to the steam engine, a speed responsive governor, a speed setting means for said governor, including an axially movable 30 spindle, means actuated by the governor for actuating the steam control valve, and a screw blade propeller driven by said engine shaft and having blades of variable pitch and having means for changing the pitch of said blades, the com- 35 bination of a cam drum having a protracted surface shape radially conforming to the necessary adjustment for the stroke of the steam control valve at different blade pitches and axially conforming to the necessary adjustment for the 40 stroke of the steam control valve at different speed settings of the governor, means connecting said cam drum and spindle for axially moving said cam drum by the movement of the spindle, 45 means connecting the drum and pitch changing means for rotating the drum upon the change in the pitch of the blades, a member in contact with and movable by the protracted surface of the cam drum, and a lever connecting said mem- 50 ber with the governor and with the steam control valve, whereby the amount of steam supply to the steam control valve is controlled by the speed of the engine shaft and by the pitch of the blades.

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