

Feb. 19, 1935.

O. NONNENBRUCH
VARIABLE GOVERNOR LINKAGE

1,991,570

Filed Nov. 20, 1930

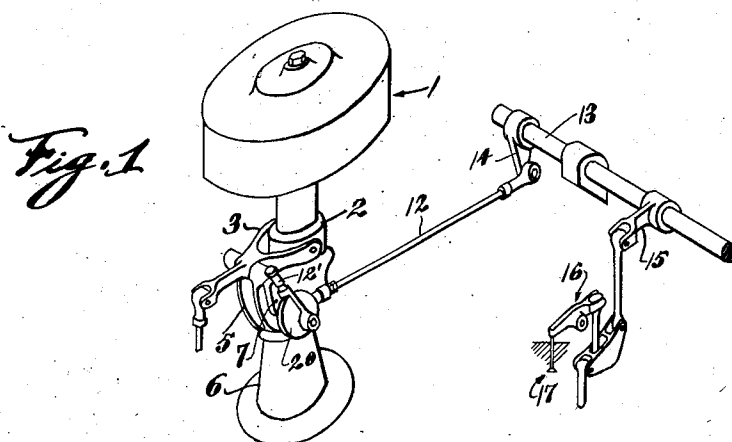
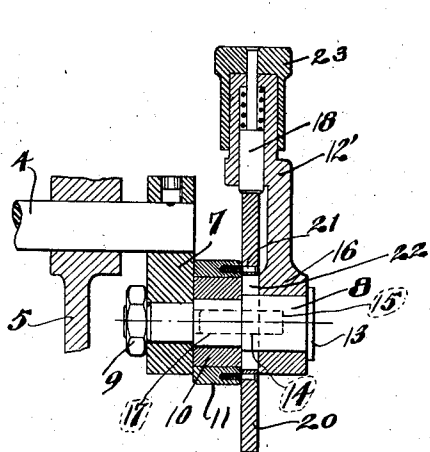
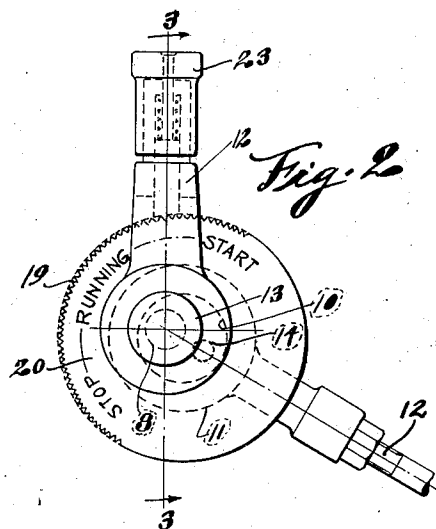


Fig. 3



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1,991,570

VARIABLE GOVERNOR LINKAGE

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Application November 20, 1930, Serial No. 496,929

3 Claims. (Cl. 123—140)

This invention relates to fuel control mechanism for an internal combustion engine such as of the Diesel type and more particularly to an improved variable governor linkage for Diesel engines.

In the usual governor control of engines such as of the Diesel type the centrifugal governor causes fuel to be added when the engine slows down thereby maintaining within close limits a substantially constant speed. However, in certain applications, for instance in the driving of centrifugal pumps this close speed regulation is not desired because with changes of the head of the pump wide speed variations may be required in order that the torque load will not exceed the capacity of the engine. If, for instance, the head conditions change so that the torque load increases for maintained speed, then the engine under the influence of this increasing torque will slow down and the governor will consequently add fuel until it reaches its stop position. This stop position with the usual governor provides an excess amount of fuel which is normally required in starting the engine. It is therefore desirable to provide means for readjusting the amount of fuel corresponding to the stop position of the governor, after the engine is started, to the amount which constitutes the maximum that is safe for operation of the engine.

One object of the invention is to provide improved means for conveniently doing this and more specifically to provide an improved manually operable and adjusting mechanism embodied within the floating link which connects the oscillating governor arm with the fuel pump mechanism. As a result the adjustment is self-contained within the floating link thereby eliminating the necessity for fixed pivot points in the adjusting mechanism and also is conducive to a relatively simple and inexpensive construction which in addition can be conveniently and easily operated.

Other objects and advantages will be more readily apparent to those skilled in the art from the following description of the accompanying drawing of which

Fig. 1 is a perspective view of a governor and its linkage control.

Fig. 2 is an enlarged front elevation of the adjusting mechanism.

Fig. 3 is a vertical transverse section taken substantially on the line 3—3 of Fig. 2.

While the arrangement shown herein is particularly adapted for the control of Diesel engines, it is of course to be understood that the same may

be applied to any prime mover for which it might be suited and particularly where there is employed a centrifugal governor such as generally shown at 1. This governor as is usual is driven by the engine through suitable gearing or belt drive, so that changes in speed will cause a governor sleeve 2 to be moved axially either upwardly or downwardly in accordance with whether the speed increases or decreases and thereby raise or lower yoke 3 which is rigidly secured as by a key or pin to a shaft 4. This shaft is journaled in a suitable bracket 5 carried by a standard 6. An arm 7 is rigidly secured to shaft 4, while a crank pin 8 extends through arm 7 and is rigidly secured thereto as by a threaded reduced portion and a nut 9. An eccentric 10 is journaled upon pin 8 and normally held in fixed relation to a strap 11 forming one end of a governor link 12. The link 12 is connected to the usual fuel regulating shaft 13 as by arm 14. This in turn operates through an arm 15 and linkage generally indicated at 16 to change the bypass opening of the fuel pump all of which is generally indicated at 17. The control linkages and fuel pump mechanism 14—17 herein diagrammatically shown are of the form generally employed in the art although it is to be considered that this form simply diagrammatically illustrates any of the various types such as are employed in the art and to which my improved adjusting mechanism is equally applicable.

In order to adjust for the maximum amount of fuel after the engine is started and thereby insure that the torque load of the engine will be maintained within its capacity, I have provided improved means self-contained within the floating link 12 so as to, in effect, vary the length of this link and thereby control the maximum deflection of a fuel regulating shaft 13. To do this a hand lever 12' is journaled upon the outer end of pin 8 and held thereon by a small flange 13. The hub portion of hand lever 12' is positively connected to the eccentric 10 by a pin 14 having one end disposed in a recess 15 formed in the inner side of the hub 16 while its other end is disposed in a suitable recess 17' formed in the eccentric 10. Hand lever 12' and eccentric 10 are held in fixed relation to the link strap 11 by the provision of a spring pressed plunger 18 engaging the serrated periphery 19 of a disc 20 which is secured to strap 11 as by screws 21. The disc 20 is provided with a central opening 22 of sufficient size to permit pin 14 to pass from the hand lever to the eccentric and not be interfered with during adjustment. The serrations on

periphery 19 are of sufficient circumferential extent as to permit a wide range of adjustments to meet either expected or unexpected conditions of operation. To release the downwardly spring pressed pin 18 a hand grip 23 is secured to the stem thereof the lower edge of which is provided with serrations to cooperate with those of the periphery 19. During adjustment the locking or holding member or pin 18 has linear movement with respect to the locking element in the form of disc 20.

In operation the handle 12' is thrown to its start position, this causing eccentric 10 to move floating link 12 to its maximum open position for starting, but after starting the attendant by raising hand grip 23 and thereby releasing plunger 18 may rotate eccentric 10 so as to effectively shorten link 12 and accordingly regulate and decrease the maximum fuel supply in accordance with operating conditions. It is seen that any intermediate position of the handle may be obtained and held due to the serrated periphery 19 although if desired a smooth peripheral surface on the disc may be frictionally and slidably engaged by a suitable plunger similar to 18. To stop the engine handle 12' is thrown to the position marked "Stop" this causing eccentric 10 to be shifted from the position shown in Fig. 2 to the opposite side of shaft 8. It is thus seen that maximum adjustment between the two elements 10 and 12, mounted respectively on pivot shaft 8 and the pivot of lever 14, is effected by movement of lever 12 within substantially 180°.

From the foregoing disclosure it is readily appreciated that a very simple construction is provided for controlling the fuel supply to an engine and one which does not necessitate any stationary pivotal supports other than those which form part of the usual governor linkages. The adjusting mechanism broadly includes two members whose axes are offset with respect to each other or in a more specific aspect the axes are disposed parallel to each other. In the specific embodiment shown these two members include shaft 8 whose axis is offset from and parallel to the center of eccentric 10 said center constituting the axis

of the eccentric with respect to the strap 11 which surrounds the eccentric. The axes of the two members are shifted relative to each other to effect the necessary adjustment.

While I have specifically shown one form which my invention may assume in practice, it is of course to be understood that various changes and modifications may be employed without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. A governor system for a prime mover having mechanism for controlling the power medium supply, a speed responsive governor driven by said prime mover, and means for operating said power medium supply mechanism by said governor including an eccentric and means for manually adjusting the same at the will of the operator thereby to substantially immediately adjust said supply mechanism to either a stop or start position or positions intermediate thereof, whereby after starting of the engine the fuel supply may be adjusted to limit the torque load of the engine.

2. Control mechanism for a prime mover having a fuel supply mechanism and a speed responsive governor, means for controlling said fuel mechanism including a crank actuated by said governor, a pin carried by said crank, an eccentric journaled upon said pin, a link journaled upon said eccentric, a hand lever connected to said eccentric, and means for holding said hand lever in a substantially fixed position relative to said link.

3. Control mechanism for a prime mover having a fuel supply mechanism and a speed responsive governor, means for controlling said fuel mechanism including a crank actuated by said governor, a pin carried by said crank, an eccentric journaled upon said pin, a link journaled upon said eccentric, a hand lever connected to said eccentric, and means for holding said hand lever in a substantially fixed position relative to said link including a disc carried by said link and a movable element carried by said hand lever and adapted for cooperation with said disc.

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