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S. E. KURTZ

GOVERNOR

Filed Sept. 22, 1921

Fig. 1.

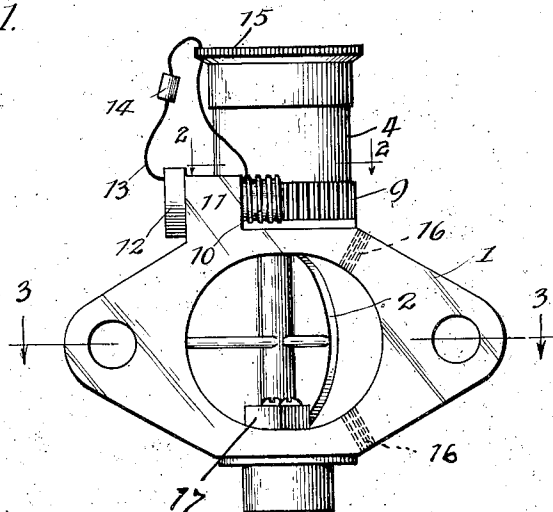


Fig. 2.

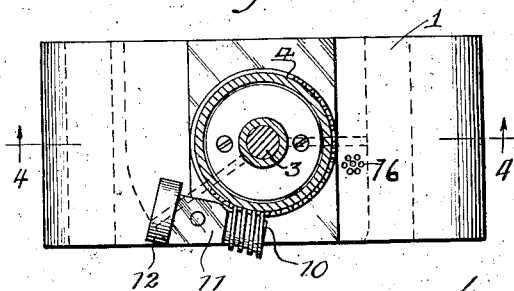


Fig. 3.

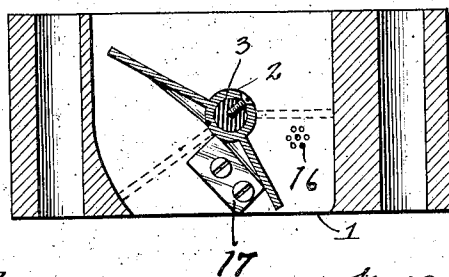


Fig. 4.

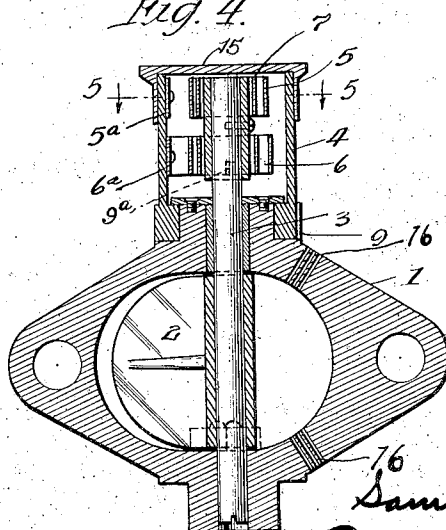


Fig. 5.

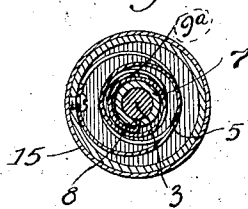
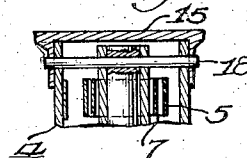


Fig. 6.



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UNITED STATES PATENT OFFICE.

SAMUEL E. KURTZ, OF SAC CITY, IOWA.

GOVERNOR.

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To all whom it may concern:

Be it known that I, SAMUEL E. KURTZ, a citizen of the United States, residing at Sac City, in the county of Sac and State of Iowa, have invented a certain new and useful Improvement in Governors, of which the following is a specification.

This invention relates to improvements in governors, particularly adapted to be used in connection with internal combustion engines for controlling the flow of power fluid to the engine. One of the difficulties presented in the control of internal combustion engines is to secure a governor which will automatically control the speed within narrow limits at variable loads, and which will be sensitive enough for this purpose.

This invention has among other objects to provide a governor which shall be extremely sensitive to variations in load and speed of the engine, thereby securing a proper and accurate control of the speed of the engine under these varying conditions between narrow limits, and which shall at the same time occupy a comparatively small space and which can be easily and quickly manufactured.

The invention has other objects which are more fully set out in the following description.

Referring now to the accompanying drawings

Fig. 1 is an end elevation of one form of governor embodying the invention;

Fig. 2 is a plan view of the device illustrated in Fig. 1.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 2.

Fig. 5 is a section on the line 5—5 of Fig. 4;

Fig. 6 is a view of the upper end of the casing showing the device for holding the valve open.

Like numerals refer to like parts throughout the several figures.

In the construction shown I provide a casing 1 open at the ends. This casing is adapted to be inserted at some point in the intake of the engine. A valve 2 is located within the casing and is pivotally mounted in any desired manner, as by being connected to the stem 3. The valve stem 3 is mounted in the casing so as to be free to rotate, one end projecting beyond the cas-

ing as illustrated, the projecting end projecting within the enclosing device 4. The valve is moved by the flowing gas so as to vary the opening through which the gas flows, and some means is provided for properly resisting this movement of the valve.

As herein shown I provide a main resisting device 5 which is illustrated as a spring and which is connected at one end to the valve stem and at the other end to a fixed device, such for example as the casing or enclosing device 4.

I have found by actual use that a single resisting device of this kind will not give the control between narrow limits which in some cases is essential, and I have further found that by adding an auxiliary opposing device 6 which opposes the main resisting device 5 and properly adjusting these two devices I can secure the control of the engine speed within exceedingly narrow limits. I have shown the auxiliary opposing device 6 as also consisting of a coiled spring, one end of which is connected with the valve stem, and the other end 6^a with a fixed part, such as the enclosing device 4. The springs 5 and 6 are opposed to each other. The spring 5 opposes the movement of the valve in response to the flow of gas through the valve casing, and the spring 6 opposes this spring 5 and assists the flowing gas in moving the valve. I have found that with this construction the valve does not act spasmodically, but is under perfect control, and controls the speed of the engine within the required narrow limits.

The springs 5 and 6 may be connected with the valve stem in any desired manner. I have illustrated a simple manner of doing this which consists in providing a sleeve 7 which is provided with the slots 8 and 9. One end of the spring 5 is slipped into one of these slots, and one end of the spring 6 into the other slot as illustrated, and the sleeve is then placed on the valve stem and secured thereto in any desired manner as by a fastening screw. The spring 6 must be weaker or be adjusted so as to have less strength than the spring 5. I prefer to provide simple and easy means for adjusting the two springs relatively. As herein shown the enclosing device 4 is rotatably mounted upon a projection 8 on the valve casing. The springs 5 and 6 are wound around, in opposite directions, the valve stem, and it will be seen that therefore when the en-

closing device 4 is rotated in one direction, it will weaken one spring and strengthen the other, and when rotated in the other direction, the spring which was previously weakened will be strengthened, and the one previously strengthened, weakened.

In order to conveniently move the enclosing device 4 and to also hold it in any desired position I provide it with teeth 9. I also provide a controlling device 10 which has teeth which engage the teeth 9. The parts are arranged so that when the controlling device is rotated, the enclosing device 4 will also be rotated. The controlling device 10 may be mounted in a bearing 11 and may be rotated by means of a head 12. I prefer to have this controlling device a worm so that it will hold the enclosing device 4 firmly in position without the necessity of an additional holding device. It will be seen that by means of this construction the two springs may be easily and quickly relatively adjusted to secure any adjustment desired, and that they will then be held in this adjusted position. I prefer to adjust the springs properly and then arrange them so that they cannot be tampered with.

For this purpose I provide some suitable sealing device. As herein shown this sealing device consists of a wire 13, the ends of which are held together by the seal 14 which will show whenever the device is tampered with. This wire may be arranged in any desired position and I have shown it as passing through the head 12 of the controlling device and a hole in the bearing 11 and also passing through a hole in the removable cap 15 of the enclosing device 4.

I have found that in some cases there is a tendency of the valve to be held closed by the vacuum produced by the engine. In order therefore to make the device more sensitive I provide some suitable means for relieving this vacuum. In the construction shown I provide means for admitting air into the passageway through which the gas flows through the engine on the side nearest the engine. Any suitable means for this purpose may be used. I have shown a convenient arrangement which does away with valves and other mechanism and which consists in providing one or more openings 16 in the valve casing nearest the end which is nearest the engine. These holes if made small do not let in any appreciable amount of air during the ordinary working of the device but in case of an undue vacuum produced by the closing of the valve, they will let in a sufficient amount of air to relieve the vacuum and let the retracting or opposing spring act to open the valve.

I prefer to place the opening or openings 16 so that when the valve is working in its normal manner these openings will be on the side of the valve farthest from the engine,

but when the valve is closed or nearly closed these openings will be on the side of the valve nearest the engine. In the first case these openings let in very little if any air, and what is let in is let in on the side of the valve away from the vacuum producing device, that is the engine, while in the second case sufficient air passes therethrough to relieve the vacuum and permit the valve to properly open. By this construction it is not necessary to have a stop because the springs can be so adjusted relatively as to have the valves stop in the right position.

A stop 17 can be provided if desired. I also prefer to provide some means for holding the valve open in the event a spring or springs should break, so that the engine can be operated without removing the valve. This result is secured by providing an opening in the casing and the valve stem, and a pin 18 passing through these holes so as to hold the valve open. The valve can thus be held open in the event anything happens to the springs, or it may be held open for any other reason if it is desired for any reason to hold it open.

I claim:

1. A governor for internal combustion engines comprising a casing, a valve stem pivoted in said casing, a valve in said casing and connected with said pivoted stem so as to be pivotally mounted in the casing and responsive to the flow of fluid through the casing so as to change its position to vary the effective opening through the casing, and a resisting device for resisting the pivotal movement of said valve due to the fluid flowing through the casing, and an auxiliary opposing device for opposing the resisting device.
2. A governor for internal combustion engines comprising a casing, a valve stem pivoted in said casing, a valve in said casing and connected with said pivoted stem so as to be pivotally mounted in the casing and responsive to the flow of fluid through the casing so as to change its position to vary the effective opening through the casing, and a resisting device for resisting the pivotal movement of said valve due to the fluid flowing through the casing, and an auxiliary opposing device for opposing the resisting device, and means for varying relatively the power of the resisting device and the auxiliary opposing device.
3. A governor for internal combustion engines comprising a casing, a valve stem pivoted in said casing, a valve in said casing and connected with said pivoted stem so as to be pivotally mounted in the casing and responsive to the flow of fluid through the casing so as to change its position to vary the effective opening through the casing a second casing, a spring in said second casing connected with said valve stem so as to re-

sist the pivotal movement of the valve due to the pressure of said fluid, and a second spring in said latter casing connected with said valve stem and acting in the opposite direction so as to oppose said first mentioned spring.

4. A governor for internal combustion engines comprising a casing, a valve stem pivoted in said casing, a valve in said casing and connected with said pivoted stem so as to be pivotally mounted in the casing and responsive to the flow of fluid through the casing so as to change its position to vary the effective opening through the casing a second casing, a spring in said second casing connected with said valve stem so as to resist the pivotal movement of the valve due to the pressure of said fluid, and a second spring in said latter casing connected with said valve stem and acting in the opposite direction so as to oppose said first mentioned spring, the ends of both of said springs connected with said second casing, and means for moving said second casing to adjust relative strength of said springs.

5. A governor for internal combustion engines comprising a casing, a valve mounted in said casing and responsive to the flow of fluid through the casing so as to change its position to vary the effective opening through the casing, a valve stem for said valve, a coiled spring connected with said valve stem, an enclosing device for said coiled spring, one end of the coiled spring being connected therewith, a second coiled spring connected with said valve stem and with said enclosing device and acting in opposition to the first mentioned spring, and means for moving said enclosing device to adjust the relative strength of said springs.

6. A governor for internal combustion

engines comprising a casing, a valve in said casing having two sections at an angle to each other, one section having a greater exposed area than the other, a valve stem to which said sections are connected and rotatably mounted in position, a second casing into which the end of said valve stem projects, a spring within said second casing and having one end connected with said valve stem and the other end connected with said second casing, said second casing being rotatably mounted upon the other casing and means for rotating said second casing, comprising a worm connected with one casing and worm teeth connected with the other casing.

7. A governor for internal combustion engines comprising a casing, a movable valve in said casing adapted to be moved by the power fluid passing through the casing so as to vary the opening through the casing, a resisting device for resisting the movement of said valve responsive to said power fluid, said casing and valve adapted to be placed in the conduit leading from the carburetor to the engine, one or more openings in said casing for admitting air into that portion of the passageway controlled by the valve when it is substantially closed between the valve and the engine so as to relieve the vacuum produced therein and permit the valve to properly open, said opening or openings arranged so that when the valve is normally working the discharge of said opening or openings will be on the side of the valve between it and the carburetor.

Signed at Sac City, county of Sac and State of Iowa, this 19th day of September, 1921.

SAMUEL E. KURTZ.