

(No Model.)

H. J. HARTIG.
GOVERNOR FOR GAS ENGINES.

No. 507,584.

Patented Oct. 31, 1893.

Fig. 1.

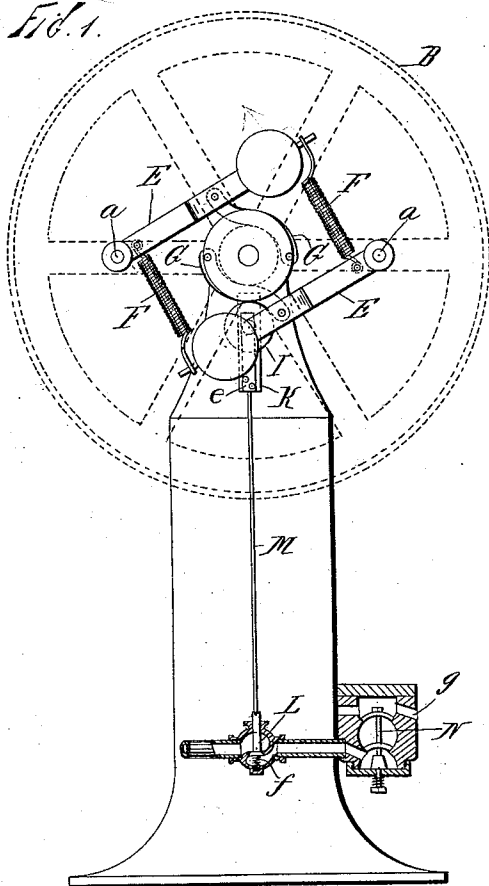


Fig. 2.

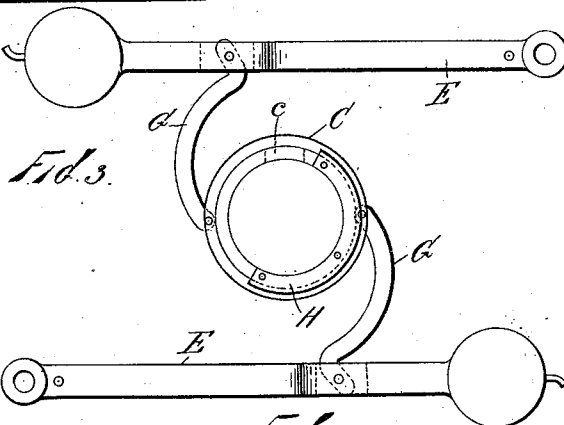
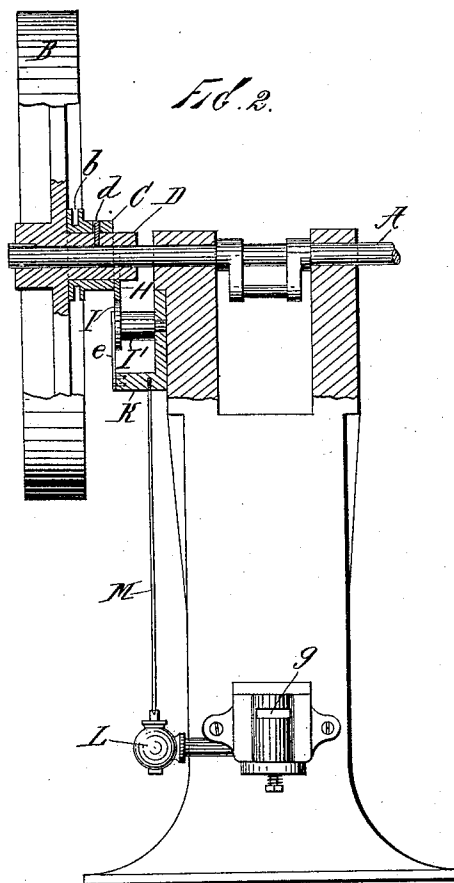
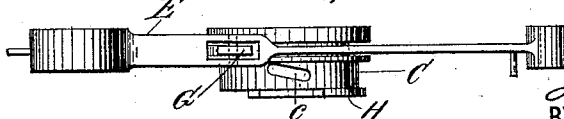


Fig. 4.



WITNESSES:

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HENRY J. HARTIG, OF BROOKLYN, NEW YORK.

GOVERNOR FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 507,584, dated October 31, 1893.

Application filed September 30, 1892. Serial No. 447,385. (No model.)

To all whom it may concern:

Be it known that I, HENRY J. HARTIG, of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Governors for Gas-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention has relation to governors, particularly such as are intended for use upon gas engines to control or regulate the speed of the engine.

The object of this invention is to provide a simple, reliable, sensitive and effective means for automatically regulating the supply or flow of gas to the explosive chamber according to the work being performed by the engine and thereby maintaining a uniform speed while at the same time effecting an economy in the consumption of fuel. To accomplish this two-fold object and to secure other advantages in the matters of construction, operation and use my improvements involve certain novel and useful arrangements or combinations of parts and particular features of construction all of which will be herein first fully described and then pointed out in the claim.

In the accompanying drawings forming part of this specification, Figure 1 is a view partly in elevation and partly in section, upon a plane cutting the engine shaft at right angles, showing my improved governor and its connection with the gas valve in place upon the engine, the position of the fly wheel being indicated by dotted lines. Fig. 2 is a similar view upon a plane through the axis of the engine shaft omitting the weighted arms. Fig. 3 is a side view and Fig. 4 a top or plan view showing the movable hub with its cam and slot and with the connected weighted arms as they appear when dismounted from their position on the fly wheel.

In all the figures like letters of reference wherever they occur indicate corresponding parts.

A represents the shaft of any gas engine and B the fly wheel applied thereon.

C is the movable hub or sleeve of my improved governor. I find it most convenient to mount this sleeve C upon the hub D of

the fly wheel in order to bring the governor close in toward the fly wheel, but in some styles of engines it might be mounted upon the shaft either inside or outside the fly wheel. The sleeve C turns easily on its mounting and is arranged also to slide thereon in the direction of its length.

E E are weighted arms pivoted as at *a a* upon the spokes of the fly wheel and held normally closed toward the shaft by springs as F F, one for each arm.

A groove or channel *b* in sleeve C accommodates the curved connecting rods G G each pivoted at one end to the sleeve and at the other to one of the arms E. The rods G are preferably made of flat metal and they are pivoted loosely and fit the channel *b* loosely so that the sleeve C may move in the direction of its length without interference. An inclined slot *c* in sleeve C receives a pin *d* secured in hub D or otherwise so that the pin and fly wheel move together.

The mounting and arrangement so far explained is such that when the fly wheel is in motion and the weighted arms swing toward its circumference, they cause the sleeve C to move on its bearing in a direction the reverse of that in which the fly wheel is moving—and at the same time the pin *d* compels the sleeve to move in the direction of its length.

H is a cam formed with or applied upon sleeve C. As the cam is revolved it ordinarily strikes a collar I upon a roller I' mounted in a block K which is mounted upon some convenient portion of the engine body so that it may slide toward and from the engine shaft. The roller I' is movable lengthwise upon its axle for reasons to be hereinafter explained and it is held normally so that the collar I shall ordinarily be struck by the cam H, by use of any suitable light spring as *e*. The purpose of making the cam strike upon a roller is to obviate undue friction and wear and prevent unnecessary shock, but the roller shown might be replaced by any sliding block.

L represents the gas supply valve of any form, the opening and closing of which regulates the charge of gas which may flow to the engine. This valve is connected as by a rod M with the movable block K, being held normally closed by a suitable spring as *f* which

spring may also serve to maintain block K in working position.

N represents a double valve through which the gas after passing valve L, and the supply of air for mixing with the gas, is drawn into the explosion chamber. At *g* is the port or opening through which the ignitor operates, the ignitor being omitted from the drawings.

As the fly wheel revolves under an ordinary load, the cam H at each revolution strikes collar I of roller I' and through block K and connecting rod M opens the gas valve L, holding it open until the cam has revolved far enough to leave the collar, when it immediately closes under the influence of spring *f*. It is immaterial how long or for what portion of each revolution of the shaft the gas valve remains open, for the charge of gas and air is only drawn into the explosion chamber at a particular part of the stroke of the piston, so that after the gas valve is once opened it may so remain until the piston reaches the proper point of its stroke the valve N meantime, excluding the gas from the cylinder. I therefore effect the regulation of the quantity of gas for each particular charge by controlling the time of opening of the gas valve L. It is plain that if the opening of this valve be delayed until the piston has reached the point of its travel at which it must cease to draw in any charge, then even though the gas valve be opened no fuel could reach the explosive chamber. As the load or work decreases the tendency of the fly wheel is to move faster, and the weighted arms swing farther out and carry the cam H backward farther upon its bearing. The consequence is that the gas valve is opened at a later period of the engine stroke and a smaller quantity of fuel is allowed to pass to the explosive chamber. The fuel being lessened in quantity the power and speed of the engine is correspondingly reduced as will be readily understood. While the cam-carrying sleeve C is being turned so as to retard or delay the striking of the cam, it is at the same time forced in the direction of its length, and when forced far enough, as it will be when the weighted arms swing out far enough, the cam H will leave the plane of collar I and will therefore fail to move block K so that the gas valve will remain closed, thereby preventing any fuel from reaching the engine and thus effectually

slacking its speed until other conditions are reached. The purpose of mounting collar I upon a sliding roller is to enable the cam to leave the collar instantly upon reaching its edge and to crowd down by it without producing any unnecessary wear as might result if the collar were confined to one plane of movement. As soon as the speed is slackened and the cam brought back far enough to strike the collar the spring *e* holds it in place to receive the blow.

The instantaneous action of the governor and accurate regulation of the speed as above indicated is important in many uses of the gas engine and especially so when used for running dynamos for electric lighting purposes. It should be observed that the regulation effected by my improved form of governor does not depend upon the omission now and then of a complete charge of gas but upon admitting at each stroke a quantity proportioned to the amount of power or work required, thereby insuring the steady movement of the engine and effecting the desired economy in the use of gas. Of course the parts are adjusted, when placed in position, to govern the engine according to the work required of it.

The improved form of governor may be easily applied on any style of gas engine. It is simple, not liable to get out of order and well calculated to answer the purposes or objects of the invention above indicated.

Having now fully described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

In a governor for gas engines, the combination with the fly wheel and the gas supply valve, of the weighted arms pivoted upon the fly wheel, the cam carrying sleeve connected with the arms, said sleeve being arranged to revolve upon its bearing and at the same time to move longitudinally thereon and to open the gas supply valve or permit the same to close, at the times and in the manner substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

HENRY J. HARTIG.

Witnesses:

W. J. MORGAN,
WORTH OSGOOD.