

(No Model.)

F. E. GAYLORD.  
STEAM ENGINE GOVERNOR.

No. 406,510.

Patented July 9, 1889.

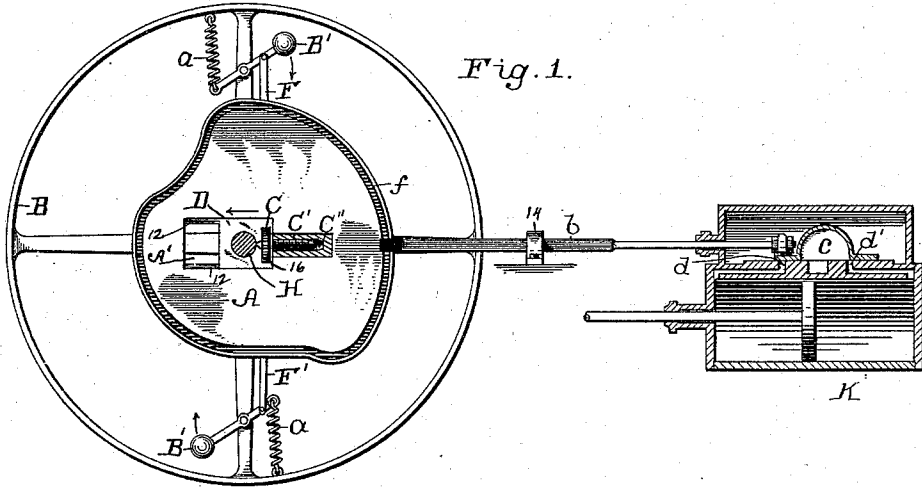


Fig. 1.

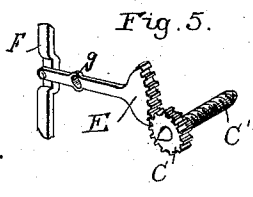


Fig. 5.

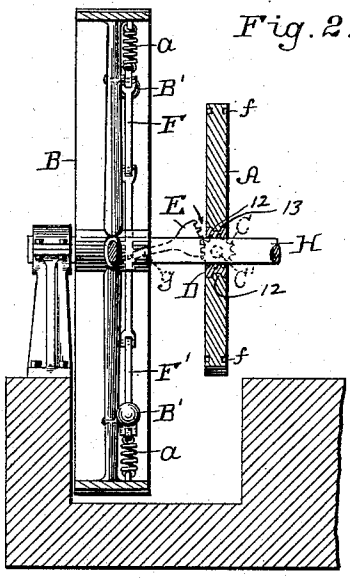


Fig. 2.

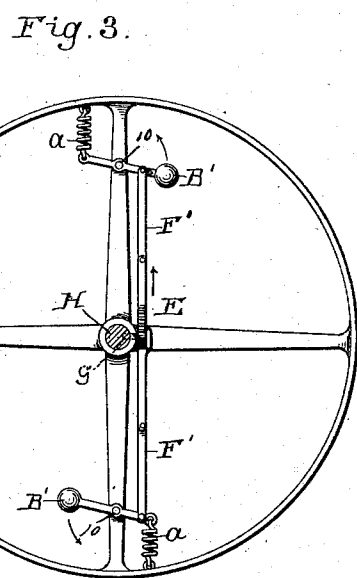


Fig. 3.

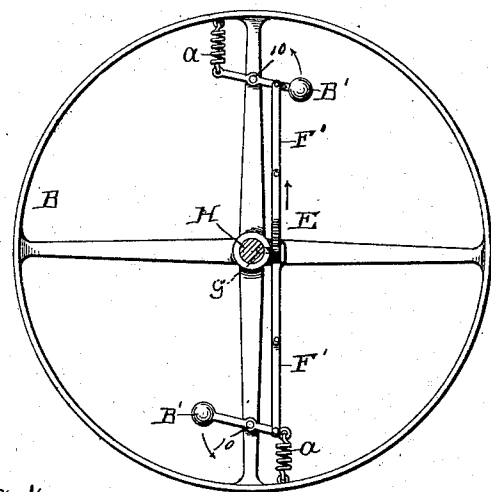
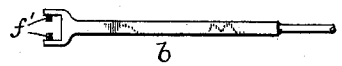


Fig. 4.



Witnesses  
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Inventor  
*F. E. Gaylord*  
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# UNITED STATES PATENT OFFICE.

FREMONT E. GAYLORD, OF KANSAS CITY, MISSOURI.

## STEAM-ENGINE GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 406,510, dated July 9, 1889.

Application filed September 8, 1888. Serial No. 284,887. (No model.)

*To all whom it may concern:*

Be it known that I, FREMONT E. GAYLORD, of Kansas City, Jackson county, Missouri, have invented certain new and useful Improvements in Steam-Engine Governors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to that class of devices commonly known as "shaft-governors;" and it consists in the novel construction, combination, and arrangement of parts, hereinafter set forth, and pointed out in the claim.

In the drawings, which illustrate the invention, Figure 1 is a side elevation of the devices constituting my invention, with steam-chest and cylinder in section. Fig. 2 is an end view with parts in section. Fig. 3 is a side elevation of a fly-wheel and centrifugal weights attached, used in making up the invention. Fig. 4 is a detail plan view of an eccentric-rod or, rather, a cam-rod; and Fig. 5 is a detail view, in perspective, of certain devices for changing the relative position of the cam-plate and the main shaft of the engine.

H represents the main shaft, which is to be set in motion by the piston in cylinder K in the usual manner, and upon which is keyed or otherwise rigidly mounted a slide-block D, and in turn a cam-plate A (of suitable size) is loosely mounted on said block, so that its position may be changed by the action of centrifugal weights B', as will be presently described. Said block D is preferably made rectangular in general form, and is provided with grooves 13 in opposite edges and with a suitable socket 16 in one end. Said cam-plate A, which in this invention is designed to act in lieu of the usual eccentric, is provided with an opening A', that is located a short distance from the center of said plate, and said opening is provided with slideways 12, corresponding to grooves 13 in block D, and said cam-plate is mounted upon this block, with its slideways engaging the grooves in the block. Said cam-plate is also provided with grooves *f* in its opposite sides, which extend around near to its edge or circumference, and which are engaged by suitable pins or rollers *f'*, carried by the shaft end of cam-rod *b*.

It will be observed that the circumference

of the cam-plate, and consequently the grooves *f*, is irregular in form, made so for purposes hereinafter described. The shaft end of cam-rod *b* is forked and provided with pins or rollers *f'*, which engage corresponding grooves *f* in the cam-plate, while its opposite end is connected to any suitable form of valve *c*, which latter is located in steam-chest carried by cylinder K, the latter being provided with the usual piston, ports *d* and *d'*, &c. Said cam-rod is also mounted in suitable stationary bearings, such as 14, so that it will move only in a straight line, and thereby impart a rectilinear motion to the valve *c* or valve-rod.

The length of opening or slot A' in cam-plate A is only sufficient to govern the point of cut-off and control the engine when running in one direction. Likewise it may be stated that the grooves in said plate can be arranged in true circles without interfering with the successful operation of the invention, said grooves being formed irregularly, as shown, for the purpose of accelerating and decreasing the speed of the valve at certain points in its stroke, but which need not be dwelt upon at this time.

At one end of slot A' in the cam-plate a threaded socket C'' is formed, and a screw C' is located in this socket and carries a small pinion C upon its free end. Pinion C is rigidly secured upon screw C', and is loosely mounted in socket 16 in the end of block D, so that when the pinion is revolved in either direction said cam-plate will be moved across shaft H, sliding on said block of course, and altering the distance between the shaft and the pins or rollers carried by the end of the cam-rod, and correspondingly altering the throw of the valve, as will be explained.

The relative position of the cam-plate upon block D is controlled by centrifugal weights B', which are provided with a shank and pivoted at 10 to the spokes of fly-wheel B on opposite sides of the main shaft, so that they will operate in unison, coiled springs *a* being attached to the ends of said shanks opposite said weights and to the rim of said wheel to return them to normal position when the engine is at rest, and to oppose their centrifugal force during operation.

Connection between pinion C and weights B' is made by means of a toothed segment E,

which is provided with a shank and pivoted at *g*, to extend in a longitudinal direction, and the end of its shank that is opposite its teeth is pivotally attached to weight-rod F, other 5 suitable rods F' connecting this rod F to said weights, as clearly shown.

The operation is as follows: Assuming that the proper tension has been given to springs *a* (which may be done in any well-known way) 10 and the engine has been started and reached its regular speed, weights B' are thrown outwardly, and remain in such position, Fig. 1, so long as the speed is not decreased. So long as the speed is maintained at proper limit 15 there will be no appreciable movement of said weights. However, should the admission of steam to the cylinder K be of such pressure as to increase the reciprocations of the piston and correspondingly accelerate the revolutions of fly-wheel B, then the increased centrifugal force will act upon weights B' and 20 tend to throw them outwardly, which it will do, and the weight-rods F and F' will turn segment E upon its pivot, said segment will turn pinion C and screw C', so as to run the screw farther into socket C'', and cam-plate A will be more centrally located upon block D, diminishing the eccentricity of the grooves 25 in said plate and thereby shortening the throw of the valve and diminishing the amount of steam that is admitted to the cylinder at each stroke, as is well understood. 30

In carrying out my invention it is evident that a number of changes in the details may be made, and I do not therefore desire to limit 35 myself to the exact construction of details that I here show, reserving for myself the right to make such changes as may properly come within the scope of my invention.

Having thus described my invention, what 40 I claim is—

The combination of slide-block D with main shaft H, the said block revolving with said shaft, plate A, having cam-grooves *f*, and arranged to slide loosely on said block, valve- 45 operating rod *b*, moved by connection with said plate, screw C', having one end threaded into a socket in plate A, pinion C, mounted on the free end of this screw and located in 50 socket 16 in said block D, toothed rack E, pivoted at *g* and meshing with said pinion, fly-wheel B, mounted on the main shaft adjacent to plate A, weights B', pivoted to the arms of said fly-wheel, opposing springs *a*, and 55 rods F F', which connect said weights to the toothed rack, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

FREMONT E. GAYLORD.

Witnesses:

F. G. FISCHER,  
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