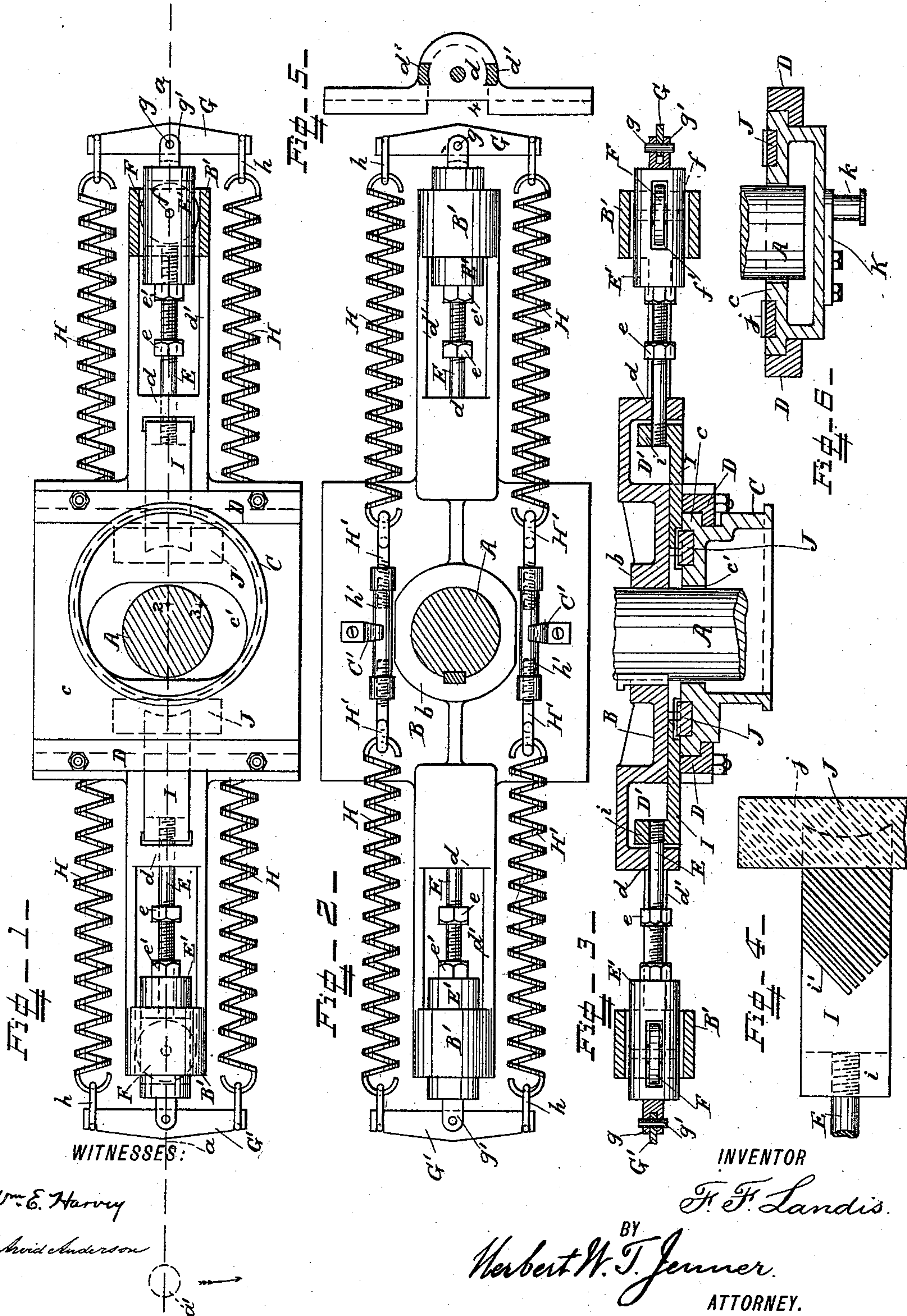


(No Model.)

F. F. LANDIS.
SPEED GOVERNOR.

No. 456,150.

Patented July 21, 1891.



INVENTOR
F. F. Landis.
BY
Herbert W. T. Jenner.
ATTORNEY.

UNITED STATES PATENT OFFICE.

FRANK F. LANDIS, OF WAYNESBOROUGH, PENNSYLVANIA.

SPEED-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 456,150, dated July 21, 1891.

Application filed November 8, 1890. Serial No. 370,796. (No model.)

To all whom it may concern:

Be it known that I, FRANK F. LANDIS, a citizen of the United States, residing at Waynesborough, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Speed-Governors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to speed-governors for steam-engines and other similar motors provided with revolving driving-shafts; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

In the drawings, Figure 1 is a front view of the governor. Fig. 2 is a rear view of the governor. Fig. 3 is a longitudinal section through the governor. Fig. 4 is a detail view of two of the diagonally-ribbed plates for moving the eccentric. Fig. 5 is an end view of the guide-plate for supporting the sliding eccentric. Fig. 6 is a side view of a portion of the governor, showing it modified to operate a small crank instead of an eccentric.

A is the revolving shaft, which is preferably the crank-shaft of the engine. A dotted line *a* in Fig. 1 indicates the axis of the engine-cylinder and slide-valve, and *a'* is a circle indicating the position of the engine-crank with respect to the eccentric when the crank is moving in the direction of the arrow. The parts of the governor are drawn to represent their positions when the engine has attained its maximum speed and the governor has moved the center of the eccentric across the shaft to the point 2, starting from the point 3, which was the position of it when the engine was at rest.

B is a guide-plate provided with the boss *b* and rigidly secured to the shaft A.

C is the eccentric provided with the slot *c'* to clear the shaft and the sliding plate *c*.

D are guides secured to the guide-plate B for retaining the plate *c* in position, so that the eccentric may be slid back and forth across the shaft A.

D' are pockets in the guide-plate B, and *d* are the inner guides, arranged radially to

the shaft and diametrically opposite to each other.

B' are the outer guides, and *d'* are distance-pieces joining the inner and outer guides together. The outer guides may be dispensed with, if desired; but they are useful, as they cause the governor to run steadier.

E are rods which slide back and forth in the guides *d*, and *e* are adjustable nuts which bear against the ends of the said guides when the governor is at rest.

E' are weights adjustably secured by screwing them upon the ends of the rods E, and *e'* are nuts for clamping the weights in any desired position on the rods.

F are rollers, journaled on pins *f* in pockets *f'* in the weights for bearing against the sides of the outer guides B', in which they slide loosely, so that the weights and rods may work back and forth with the least possible friction.

G is an equalizing-bar, pivoted by the pin *g* to the double eye *g'*, projecting from one of the weights E', and G' is a cross-bar rigidly secured to a similar double eye projecting from the opposite weight E', but otherwise similar to the equalizing-bar.

H are springs, one end of each of which is pivotally connected by a link *h* to the ends of the bars G or G'.

H' are eyebolts engaging with the other ends of the springs, and *h'* are right and left handed screw-threaded sleeves which engage with the said eyebolts and couple the springs together in pairs.

C' are hooked stops secured to the back of the guide plate B to prevent the sleeves and springs from flying out laterally from the shaft when the governor is being rapidly revolved.

The inner ends of the rods E are secured into the lugs *i* of the plates I, which lugs slide back and forth in the pockets D' of the guide-plate. The plates I slide in the slots 4 of the guide-plate, and are provided with diagonal ribs *i'* upon their faces. J are plates provided with similar diagonal ribs *j*, and secured in pockets in the back of the plate *c* of the eccentric. The projecting ribs of the two plates J incline in opposite directions and engage with the correspondingly-inclined ribs *i'* on the plates I. The governor operates by the

centrifugal force engendered by the rapidly-revolving springs, cross-bars, weights, and rods, and the said force acts upon the plates I in equal quantities at each side of the shaft in opposite directions and in line with the axes of the rods E. The plates I are moved apart by the said rods and thereby move the center of the eccentric in a straight line across the shaft. This movement of the eccentric increases the extent of its angular advance in front of the crank and causes the steam to be cut off earlier by the slide-valve. The eccentric may be connected to the slide-valve by any approved form of eccentric-rod and with or without the use of an intermediate rocking lever, as found convenient.

The slide-valve may be of any approved form and may be either the main distributing-valve of the engine or a cut-off valve on the back of the main valve. A balanced slide-valve is preferred, so that the governor will not have to work against a high resistance. The pivoted equalizing-bar keeps the centrifugal force equal upon each rod E, and the cross-bar opposite to the equalizing-bar is rigidly secured to the weight instead of being pivoted like the equalizing-bar, so that a vibrating motion cannot be set up by the springs when the governor is revolving.

The slot of the eccentric obliges the eccentric to be made of considerable diameter; but, if desired, a small crank K may be used in place of the eccentric, as shown in Fig. 6. In this modification the governor is secured near the end of the shaft A. The arm of the crank K is secured to the sliding plate c and projects beyond the end of the shaft, so that the center of the crank-pin k may occupy the positions similar to the center of the eccentric, as hereinbefore described.

What I claim is—

1. In a speed-governor, the combination, with a guide-plate secured to the shaft and provided with two diametrically-opposite radial guides, of the rods sliding in the said guides and provided with spring-controlled weights, the diagonally-ribbed plates secured to the said rods, and a valve-actuating device—such as an eccentric—supported by the guide-plate and provided with diagonal ribs engaging with the ribs on the said plates, substantially as and for the purpose set forth.

2. In a speed-governor, the combination, with a guide-plate secured to the shaft and provided with two diametrically-opposite radial guides, of the rods sliding in the said

guides and provided with spring-controlled weights, the diagonally-ribbed plates secured to the said rods, the eccentric provided with a sliding plate and with diagonal ribs engaging with the ribs on the said plates, and the guides secured to the guide-plate for retaining the sliding plate of the eccentric in position, substantially as and for the purpose set forth.

3. In a speed-governor, the combination, with the revoluble guide-plate provided with two diametrically-opposite radial guides, of the weighted rods sliding in the said guides, the pivoted equalizing-bar, the rigid cross-bar, and the springs secured between the ends of the said cross-bar and equalizing-bar and adapted to press the said rods inwardly, substantially as set forth.

4. In a speed-governor, the combination, with the guide-plate secured to the shaft and provided with the inner and the outer guides arranged in line with each other at opposite sides of the shaft, of the spring-controlled rods sliding in the said inner guides and the weights secured to the said rods and provided with rollers engaging with the outer guides, substantially as and for the purpose set forth.

5. In a speed-governor, the combination, with the guide-plate secured to the shaft and provided with two diametrically-opposite radial guides, of the weighted rods sliding in the said guides, the pivoted equalizing-bar, the rigid cross-bar, the springs attached to the ends of the said bars, the eyebolts attached to the end of the springs, and the screw-threaded sleeves coupling the said eyebolts together and permitting the tension of the springs to be adjusted, substantially as set forth.

6. In a speed-governor, the combination, with the guide-plate secured to the shaft, the radial sliding rods supported by the said plate, and the longitudinally-extensible springs coupled together and operatively connected with the said rods, substantially as set forth, of the stops secured to the guide-plate and bearing against the connecting-joints of the springs, whereby the joints and the springs may be prevented from spreading laterally, substantially as set forth.

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

FRANK F. LANDIS.

Witnesses:

HERBERT W. T. JENNER,
G. ARVID ANDERSON.