

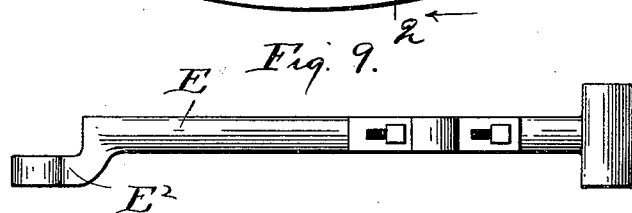
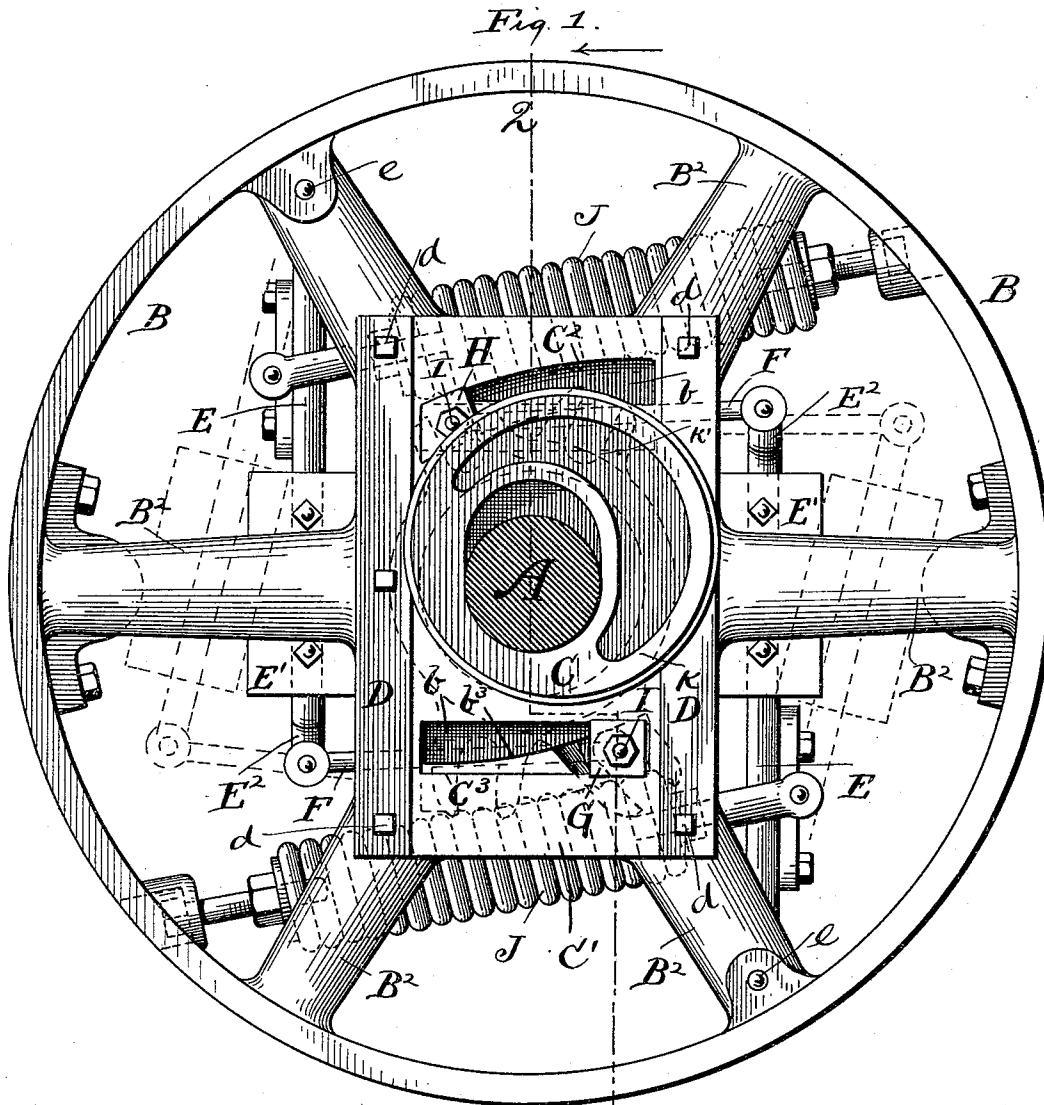
(No Model.)

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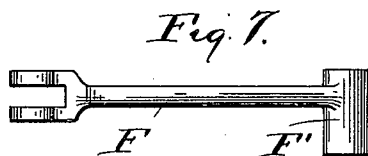
F. C. DIETZ.
GOVERNOR FOR STEAM ENGINES.

No. 481,141.

Patented Aug. 16, 1892.



Witnesses.
E. Byron Gilchrist.
[Signature]



Inventor.
Frederick C. Dietz
By Leggett & Leggett,
his Attorneys.

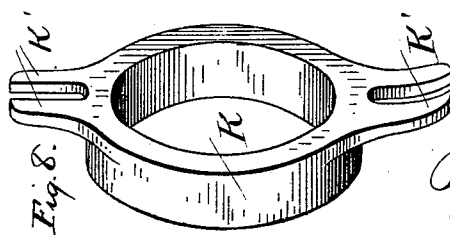
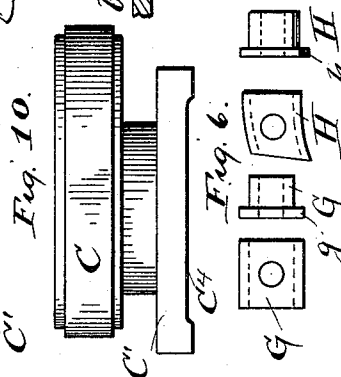
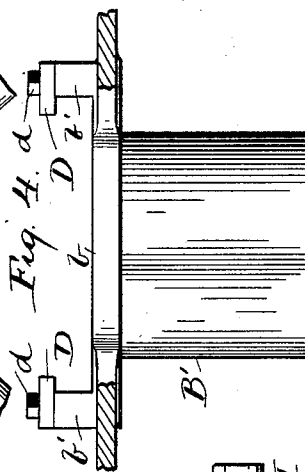
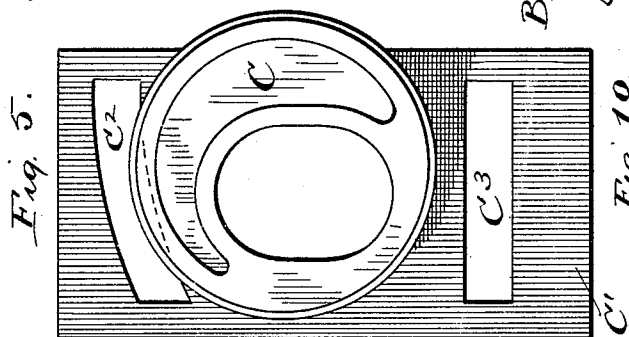
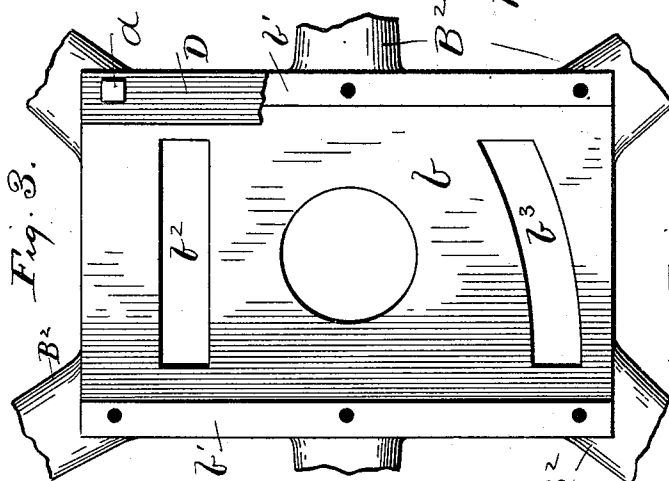
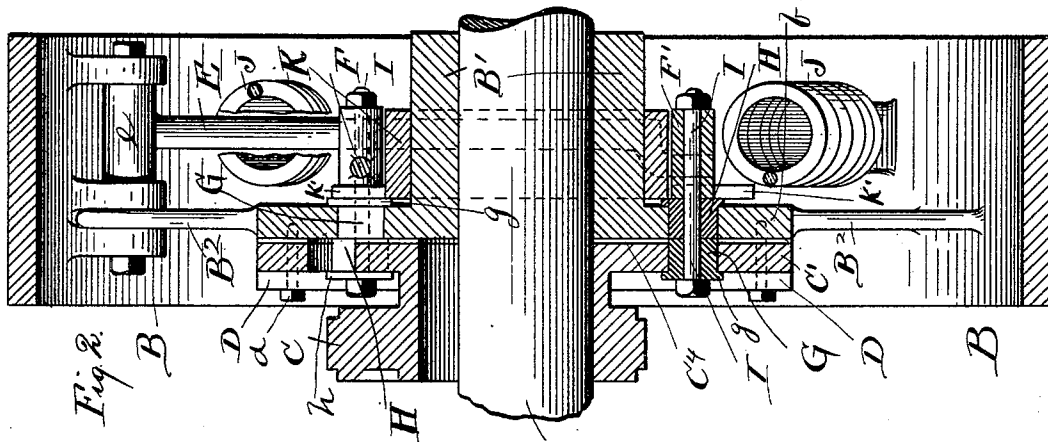
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2 Sheets—Sheet 2.

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Frederick C. Dietz

By Leggett & Leggett
his Attorneys.

UNITED STATES PATENT OFFICE.

FREDERICK C. DIETZ, OF ZANESVILLE, OHIO, ASSIGNOR TO THE BLANDY MACHINE COMPANY, OF SAME PLACE.

GOVERNOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 481,141, dated August 16, 1892.

Application filed May 3, 1892. Serial No. 431,717. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK C. DIETZ, of Zanesville, in the county of Muskingum and State of Ohio, have invented certain new and useful Improvements in Governors for Steam-Engines; 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 pertains to make and use the same.

My invention relates to improvements in cut-off governors for steam-engines; and my invention consists more especially in governing mechanism that is self-locking at any position of the parts, as against being moved by force exerted by the valve-gear, resulting in the perfect regulation of the speed of the engine, and whereby the speed of the engine is perfectly regulated under any change of load; and it consists, further, in certain features of construction and arrangement of parts for realizing other advantages hereinafter specified.

In the accompanying drawings, Figure 1 is an elevation of a governor embodying my invention. Fig. 2 is a section on line 2 2, Fig. 1, looking in the direction of the arrow. Figs. 3, 4, 5, 6, 7, 8, 9, and 10 are views in detail.

Referring to the drawings, A represents the main or driving shaft of a steam-engine, and B represents the wheel of the governor fast upon the driving-shaft, B' representing the hub, and B² the arms, of said wheel.

C represents an eccentric loosely mounted on shaft A at one side of wheel B, the same being adapted to be operatively connected with the valve-gear (not shown) of the steam-engine in the usual well-known manner. Hub B' of wheel B at the end adjacent eccentric C terminates in a plate or flat member *b*, that connects arms B² with the hub of wheel B. Plate or member *b* is preferably of the form shown in Figs. 3 and 4, and eccentric C at its end next adjacent plate or member *b* terminates in a similarly-shaped plate or flat member C', that is adapted to be slid endwise stationary plate or member *b*, as hereinafter described, the latter having laterally-projecting oppositely-disposed flanges *b'*, that form guides for sliding plate or member C', (shown very clearly in Figs. 3 and 4,) cap-plates, as

at D, being provided to hold sliding plate or member C' against plate part *b* of hub B', being secured to plate *b*, for instance, by means of bolts *d*. Plates or member *b* and C' are slotted at opposite sides of driving-shaft A, as at *b*² *b*³ C² C³, respectively, (see Figs. 3 and 5,) one slot of each plate (slots *b*² C²) being arranged at right angles to the axis of shaft A, whereas the other slot (slots *b*³ C³) is inclined thereto, and the arrangement is such that slots *b*² C² are adapted to register with the inclined slots C² *b*³, respectively.

At the opposite side of the plate part *b* of hub B' of wheel B and at diametrically-opposite sides of the latter are located weighted levers E, the same being pivoted, as at *e*, to the inner periphery of the wheel E', representing the weights. At their opposite ends levers E have pivotally-attached links or connecting-rods F, that are operatively connected with sliding plate C', respectively, at points diametrically opposite of shaft A.

G and H represent blocks (shown detached in Fig. 6) located within and adapted to operate endwise of the respective slots in plates or members *b* C', the same being pivotally attached by means of a pin or bolt I with the adjacent extremity of the respective links F, (a link F being shown detached in Fig. 7,) said extremity of the link comprising a comparatively long sleeve F', affording ample bearing for the pivotal pin or bolt. Blocks G H are preferably flanged laterally, as at *g* *h*, with the flanges abutting the outside of the respective plates or members *b* C', thereby avoiding any possibility of adjacent blocks from rubbing or binding the one upon the other. Blocks G H are of such construction as to conform to the slot in which they are adapted to operate, respectively.

J J represent two coil-springs located diametrically opposite each other, the same being adjustably secured in any well-known manner to the rim of wheel B and to weighted levers E, and performing the function common to such springs in this class of governors. There being no novelty in weighted levers E and springs J *per se* and the manner of connecting the same being well understood, it is not considered necessary to more fully describe the same.

The operation of the mechanism hereinbefore described for effecting the cut-off by controlling or regulating the travel of the valve will be readily understood, and, briefly described, it is as follows: As weighted levers E begin to move outward by the centrifugal force developed in their weights, blocks G H are slid in the respective slots in plates or members *b* C' and plate C' is slid on plate part *b* of the hub of wheel B to throw or move the eccentric across the shaft in the direction to reduce the travel of the valve, changing the cut-off and holding the engine at the speed required, and in the case of a change of load the weights move outwardly or inwardly, causing a longer or shorter throw of the eccentric and valve-rod, as required, to perfectly regulate the speed of the engine. A preferable construction of inclined slots *b*³ and C² is shown in the drawings, wherein the incline is not straight, but a gradual curve with the curvature such that as weighted levers E move outward the eccentric will be thrown two-thirds or approximately two-thirds of the distance across the shaft during the first half of the motion, slowing as the ports of the steam-cylinder are being closed and the cut-off changed, and vice versa as the ports are opened, thereby giving close and perfect regulation under any change of load. A simultaneous action of weights E' of levers E is positively had by means of a yoke, (shown detached in Fig. 8,) that comprises a sleeve K, mounted on the hub of wheel B, and a laterally-projecting member or members K' at diametrically-opposite sides of sleeve K, adapted to cause pins or bolts I, upon which sliding blocks G H are mounted, to be simultaneously actuated, a preferable construction being shown wherein said yoke engages sleeves F' of links or connecting-rods F, through which said pins or bolts pass.

Another advantage of my improved governor consists in the arrangement of the parts so as to equalize the weight in the wheel of the governing mechanism. It will be observed upon reference to the drawings that the eccentric and sliding plate are on one side of the arms of the wheel, whereas the weighted levers, yoke, and springs are on the opposite side.

Another detail in the construction to which I would call attention consists in the crook E² of levers E (a lever E being shown detached in Fig. 9) where the same connect with links or connecting-rods F, thereby, as shown in Fig. 2, causing the pull or draft on pins or bolts I, that operate blocks G H, to be central or approximately central on said pins or bolts.

To reduce the bearing surface, and consequently the friction between plates *b* C', the one plate, preferably plate C', as shown, is cut away, as at C⁴, (sliding plate C' and eccentric C being shown detached in Fig. 10.)

I would here remark that rollers may be employed in place of blocks G H, and other

slight modifications may be made in the details of construction without departing from the spirit and purpose of my invention.

What I claim is—

1. In a governor for steam-engines, the combination, with the engine-shaft, a plate stationary upon said shaft, an eccentric for the purpose indicated loose upon said shaft, and a sliding plate rigid with said eccentric, said plates being slotted at diametrically-opposite sides of the engine-shaft, of blocks or suitable devices adapted to operate in said slots, the arrangement of the latter relative to each other being such that upon the movement of said blocks or other devices endwise of said slots the sliding plate aforesaid is moved upon the stationary plate and the eccentric is thrown across the engine-shaft, as required, substantially as and for the purpose set forth.

2. In a governor for steam-engines, the combination, with the engine-shaft, a plate stationary upon said shaft, an eccentric for the purpose indicated loose upon said shaft, and a sliding plate rigid with said eccentric, said plates being slotted at diametrically-opposite sides of the engine-shaft, of blocks or suitable devices adapted to operate in said slots, the arrangement of the latter relative to each other being such that upon the movement of said blocks or other devices endwise of said slots the sliding plate aforesaid shall be moved upon the stationary plate, and the eccentric during its movement to cause the valve-gear to close the ports of the steam-cylinder shall be thrown a greater distance during the first half of the movement of said blocks or devices than during the last half of their movement, and vice versa, during the opening of the ports of the steam-cylinder, substantially as and for the purpose set forth.

3. In a governor for steam-engines, the combination, with the engine-shaft, a plate stationary upon said shaft, an eccentric for the purpose indicated loose upon said shaft, and a sliding plate rigid with said eccentric, the stationary plate being provided with guides for the sliding plates and both plates being slotted at diametrically-opposite sides of the engine-shaft, of blocks or suitable device adapted to operate in said slots, the arrangement of the latter relative to each other being such that upon the movement of said blocks or other devices endwise of said slots the sliding plate aforesaid shall be moved upon the stationary plate and the eccentric thrown across the engine-shaft, as required, substantially as and for the purpose set forth.

4. In a governor for steam-engines, the combination, with the engine-shaft, a plate stationary upon said shaft, an eccentric for the purpose indicated loose upon said shaft, and a sliding plate rigid with said eccentric, the stationary plate being provided with guides for the sliding plate, both plates being slotted at diametrically-opposite sides of the engine-shaft, of blocks or suitable devices adapted to operate in said slots, the arrangement of

the latter relative to each other being such that upon the movement of said blocks or other devices endwise of said slots the sliding plate aforesaid shall be moved upon the stationary plate and the eccentric thrown across the engine-shaft, as required, and suitable means, substantially as indicated, for holding the sliding plate against the stationary plate, substantially as and for the purpose set forth.

5. In a governor for steam-engines, the combination, with the engine-shaft, a plate stationary upon said shaft, an eccentric for the purpose indicated loose upon said shaft, and a sliding plate rigid with said eccentric, the stationary plate being provided with guides for the sliding plate, both plates being slotted at diametrically-opposite sides of the engine-shaft, of blocks or suitable devices adapted to operate in said slots, the arrangement of the latter relative to each other being such that upon the movement of said blocks or other devices endwise of said slots the sliding plate aforesaid shall be moved upon the stationary plate and the eccentric thrown across the engine-shaft, as required, one of said plates upon the side opposing the other plate being cut away to reduce the friction between the plates, substantially as set forth.

6. In a governor for steam-engines, the combination, with the engine-shaft, a plate stationary upon said shaft, an eccentric for the purpose indicated loose upon said shaft, and a sliding plate rigid with said eccentric, the stationary plate being provided with guides for the sliding plate, both plates being slotted at diametrically-opposite sides of the engine-shaft, of blocks or suitable devices adapted to operate in said slots, the arrangement of the latter relative to each other being such that upon the movement of said blocks or other devices endwise of said slots the sliding plate aforesaid shall be moved upon the stationary plate and the eccentric thrown across the engine-shaft, as required, and a yoke adapted to insure the simultaneous operation of the sliding blocks or their equivalent in the slots of the plates aforesaid, substantially as set forth.

7. In a governor for steam-engines, the combination, with the engine-shaft and an eccentric for the purpose indicated loose upon the shaft, of weighted levers, as at E, mechanism operatively connecting said levers with said eccentric and adapted to throw the latter across the engine-shaft, as required, and a yoke mounted on the engine-shaft, said yoke loosely connected with and adapted to insure the simultaneous action of said weighted levers, substantially as and for the purpose set forth.

8. The combination, with the main or driving shaft of a steam-engine, of governing mechanism comprising a wheel, as at B, fast upon said shaft, a plate, as at b, rigid with the hub of said wheel, an eccentric for the

purpose indicated loose upon said shaft, a sliding plate rigid with said eccentric, both of said plates being slotted at diametrically-opposite sides of the engine-shaft, blocks or suitable devices adapted to operate endwise of said slots, substantially as indicated, weighted levers, as at E, and links or rods operatively connected with said blocks or their equivalents and with said weighted levers, the arrangement of the slots in the plates aforesaid being such that upon the movement of said blocks or their equivalents endwise of said slots the sliding plate aforesaid is moved upon the stationary plate and the eccentric thrown across the engine-shaft, as required, and a yoke adapted to insure the simultaneous action of said weighted levers, substantially as and for the purpose set forth.

9. The combination, with the main or driving shaft of a steam-engine, of governing mechanism comprising a wheel B, fast upon said shaft, a plate b, rigid with said wheel, an eccentric for the purpose indicated loose upon said shaft, sliding plate C', rigid with said eccentric, both of said plates being slotted, substantially as shown and described, pins or bolts I, weighted levers E, links or rods operatively connecting pins or bolts I with said weighted levers, blocks or suitable devices loosely mounted upon said pins or bolts and adapted to operate endwise of the slots in the plates aforesaid, a yoke adapted to insure simultaneous action of said weighted levers, and springs J, the sliding plate and eccentric being located at one side of the arms of wheel B, and weighted levers E, connecting-rods F, and springs J being located at the opposite side of said arms, all substantially as and for the purpose set forth.

10. The combination, with the main or driving shaft of a steam-engine, of governing mechanism comprising a wheel B, fast upon said shaft, a plate b, rigid with said wheel, an eccentric for the purpose indicated loose upon said shaft, sliding plate C', rigid with said eccentric, both of said plates being slotted, substantially as shown and described, pins or bolts I, weighted levers E, links or rods operatively connecting pins or bolts I with said weighted levers, blocks or suitable devices loosely mounted upon said pins or bolts and adapted to operate endwise of the slots in the plates aforesaid, the arrangement and construction of weighted levers E relative to pins or bolts I and connecting-rods F being such as to bring the draft or pull upon pins or bolts I centrally of the latter, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 7th day of April, 1892.

FREDERICK C. DIETZ.

Witnesses:

A. V. SMITH,
GEORGE BROWN.