

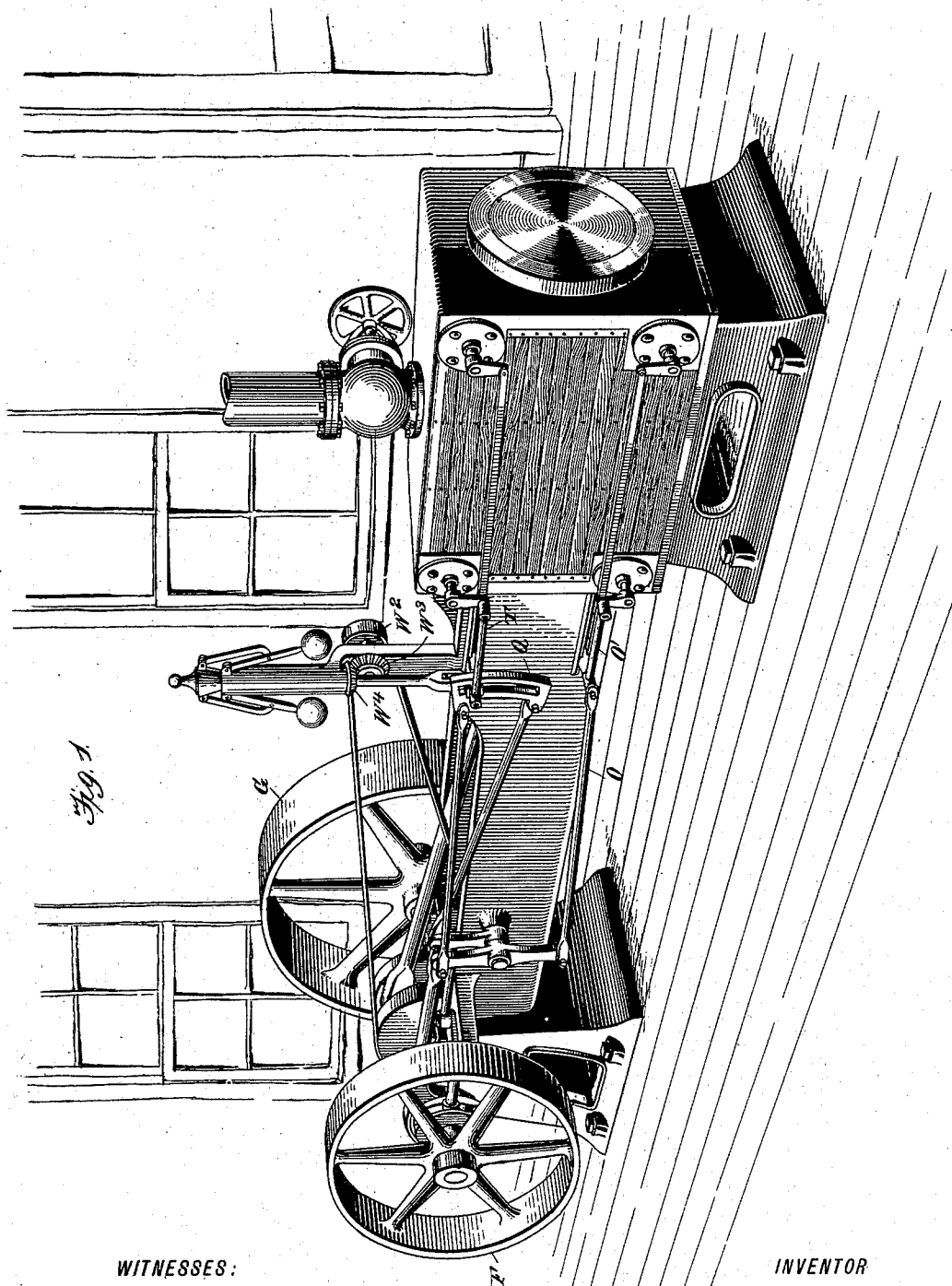
(No Model.)

2 Sheets—Sheet 1.

O. P. HART.
VALVE GEAR.

No. 573,875.

Patented Dec. 29, 1896.



WITNESSES:

J. C. Shaw
Chas. E. Brock

INVENTOR

O. P. Hart,
BY
O.inearaten
ATTORNEYS

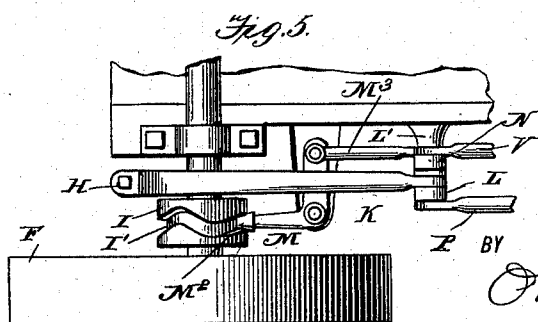
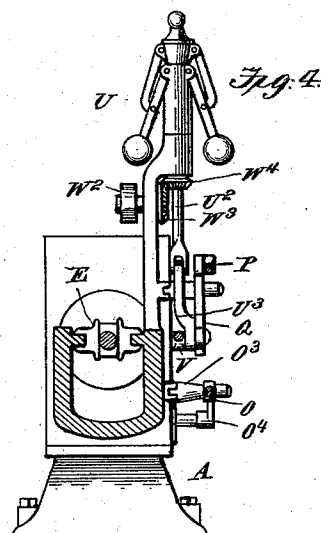
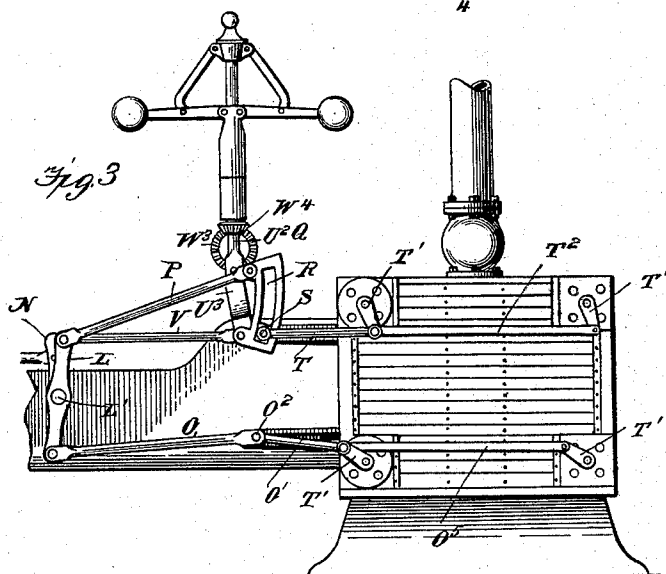
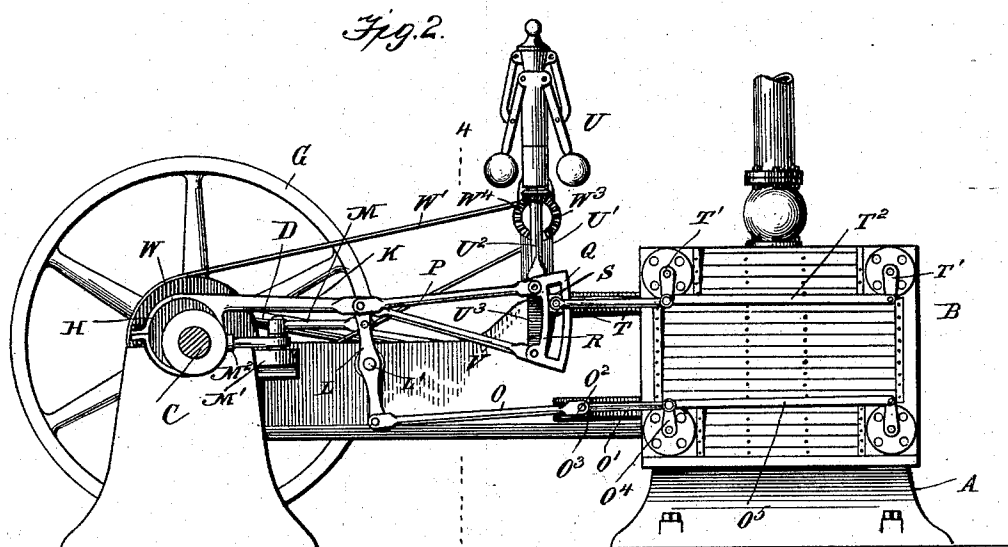
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2 Sheets—Sheet 2.

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VALVE GEAR.

No. 573,875.

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UNITED STATES PATENT OFFICE.

OZIAS P. HART, OF MURPHYSBOROUGH, ILLINOIS, ASSIGNOR OF ONE-HALF
TO JAMES L. RAINEY, OF SAME PLACE.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 573,875, dated December 29, 1896.

Application filed June 27, 1896. Serial No. 597,142. (No model.)

To all whom it may concern:

Be it known that I, OZIAS P. HART, residing at Murphysborough, in the county of Jackson and State of Illinois, have invented a new and Improved Steam-Engine Valve-Gear, of which the following is a specification.

This invention relates generally to steam-engines, and more particularly to an improved valve-gear for regulating speed of said engines.

The object of my invention is to provide a new form of valve-gear which shall be exceedingly cheap in construction and easily applied and thoroughly efficient in operation.

Another object is to provide a valve-gear which can be applied to any of the machines now in use, and particularly to the engine of the Corliss type.

Another object of my invention is to provide a valve-gear which can be applied to engines provided with either a rotary or sliding valve.

Another object is to provide a valve-gear which shall be extremely quick and active, and its movements thereby regulating the inlet of steam, and consequently the speed of the engine.

With these various objects in view my invention consists in the peculiar construction of the various parts and in their novel combination or arrangement, all of which will be fully described in detail, and pointed out in the claims.

In the drawings forming a part of this specification, Figure 1 is a view showing my invention in use. Fig. 2 is a side elevation of the engine running at a low rate of speed. Fig. 3 is a partial side elevation running at a high rate of speed. Fig. 4 is a sectional view on the line 4 4 of Fig. 2. Fig. 5 is a partial top plan view.

In carrying out my invention I employ a bed A, upon which is located the steam-chest, the drive-shaft C, and all the operative parts of the engine. The cylinder and steam-chest are shown incased and provided with rotary inlet and exhaust valves, and it will of course be understood that slide-valves can be used if so desired. The drive-shaft C is provided with a crank portion, to which is attached the pitman D, operating the piston-rod. Upon

one end of the drive-shaft is mounted the drive-wheel F, while upon the opposite end is mounted the fly-wheel G.

Between the engine-bed and band-wheel an eccentric H is mounted upon the drive-shaft, and between said eccentric and the band-wheel is mounted a drum I, having a cam-groove I'.

Connected to the eccentric H is a pitman K, the forward end of which is pivotally attached to the upper end of a lever L, said lever being pivoted on a stub-shaft L', which projects laterally from the side of the engine body or frame.

An elbow-lever M is pivoted upon an arm M', projecting laterally from the engine body or frame at a point to the rear end of said stub-shaft L', the rear end of said elbow-lever being provided with an antifriction-roller M², which is adapted to travel in the cam-groove I' of the drum I, and as the drive-shaft and drum revolve the elbow-lever is operated.

A short pitman-rod M³ is attached to the forward end of the elbow-lever, said pitman-rod in turn engaging the upper ends of a lever N, pivoted also upon the stub-shaft L', but upon the inner side of the lever L. The lower end of the lever L has a link-rod O pivotally connected therewith, the forward end of said rod being connected with the valve-rod O' through the medium of a wrist-pin O² and slide O³, in which said wrist-pin slides, the said rod O' being connected with the crank O⁴, carried upon the outer end of the exhaust-valve shaft, and this crank is connected with the opposite crank O⁴ by means of a link O⁵, whereby both exhaust-valves are operated simultaneously.

To the upper end of the lever L is attached the link-rod P, said link-rod being pivotally attached to the upper end of a slotted link Q, said link having a grooved slot R, in which slides a block S, to which the rod T is attached, said rod T being connected to the crank-arm T', mounted upon the end of the steam-valve shaft, and this crank-arm T' is connected with the opposite crank T' by means of a link T², so that both steam-valves operate in unison.

An automatic ball-governor U is mounted upon the arm U', which projects upwardly

from the engine bed or frame, the shaft U² of said governor being connected at its lower end to a hanger U³, which is pivotally attached at its lower end to the lower end of the link Q, and the link-rod V is also pivotally attached at this point, said link-rod being connected at its rear end to the upper end of the lever N.

The governor is operated from the drive-shaft by means of a pulley W and band W', said band W' passing around a small pulley W², mounted on the side of the arm U' and carrying a gear W³, which meshes with a similar gear W⁴, through the medium of which the governor is revolved, and it will be readily understood that as the speed increases the arms of the governor are thrown outward by centrifugal action and the shaft U² is raised or drawn upward. This action raises the link Q, through the medium of the hanger U³, and thereby lifts the rod P to an upward position, so that its force or thrust does not affect the steam-valve, but, on the contrary, the thrust of the rod V becomes direct-operating, and consequently operates the steam-rod.

Now it will be readily seen that the lever L is operated from the eccentric upon the drive-shaft and that the lever N is operated from the cam-grooved drum upon the drive-shaft, and it will be understood that the eccentric is so shaped with reference to the cam-groove of the drum that the thrust of the lever M will be greater than that of the lever N, so that when the link Q is elevated to the position shown in Fig. 3, or in fact to any intermediate position, it is clear that the thrust of the lever L and rod P are limited, and when the link is raised to its full limit the lever L ceases to have any effect whatever upon the steam-valve, but said valve is governed entirely by the action of the lever N. Thus it will be seen that as the speed increases and the governor operates to lift the link the steam is cut off in proportion and the speed thereby regulated. Thus it will be seen that I provide an exceedingly cheap, simple, and efficient form of valve-gear, which acts with rapidity and accuracy, and one which can be applied to any of the engines now in use provided with either rotary or slide valves.

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

1. In a valve-gear for steam-engines the combination with the curved slotted link, of a governor connected therewith and adapted to raise and lower the same, the drive-shaft having an eccentric and a cam-grooved drum, the pitman connected with the eccentric, the lever to which said pitman is connected the link-rods connected with the opposite end of

said lever, one of which is connected to the upper end of the slotted link while the other is connected with the exhaust-valve mechanism, an elbow-lever operatively connected with the cam-grooved drum, a lever to which said elbow-lever is attached and the link-rod extending from said lever to the lower end of the slotted link all arranged substantially as shown and described.

2. In a valve-gear for steam-engines, the combination with the drive-shaft and wheels and the cylinder and steam-chest, of the governor constructed as described, the slotted link with which said governor is connected, the eccentric and cam-grooved drum, parallel levers pivoted upon the engine-bed and operatively connected with the said eccentric and drum, the inner lever having a link-rod connected to its upper end, the forward end of which link-rod is connected to the lower end of the slotted link, the outer lever having a link-rod connected to its upper end, the forward end of which link-rod connects with the upper end of the slotted link, a link-rod connected to the lower end of the outer lever, the forward end of which connects with the exhaust-valve mechanism, and means for connecting the slotted link with the steam-valve mechanism all arranged substantially as shown and described.

3. In a steam-valve mechanism, the combination with the engine-bed, the drive-shaft and wheels and cylinder and steam-chest, of a governor having a depending shaft, curved slotted link, the hanger pivotally connected to the lower end of the governor-shaft with the lower end of the slotted link, the eccentric mounted upon the drive-shaft, the pitman connected to the said eccentric, a lever to which said pitman is attached, the link-rod connected to the upper end of said lever and attached at its forward end to the upper end of the slotted link, the link-rod attached to the lower end of said lever and connected at its lower end with the exhaust-valve mechanism, the cam-grooved drum mounted also upon the drive-shaft, the elbow-lever adapted to engage said drum, a short pitman connected to said elbow-lever, a lever to which said pitman is attached, a link-rod connecting the said lever with the lower ends of the slotted link, the block sliding in the slot of said link and the steam-valve-operating rod attached to the said block and to the steam-valve mechanism and means for operating the governor from the drive-shaft substantially as shown and described.

OZIAS P. HART.

Witnesses:

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W. W. OZBURN.