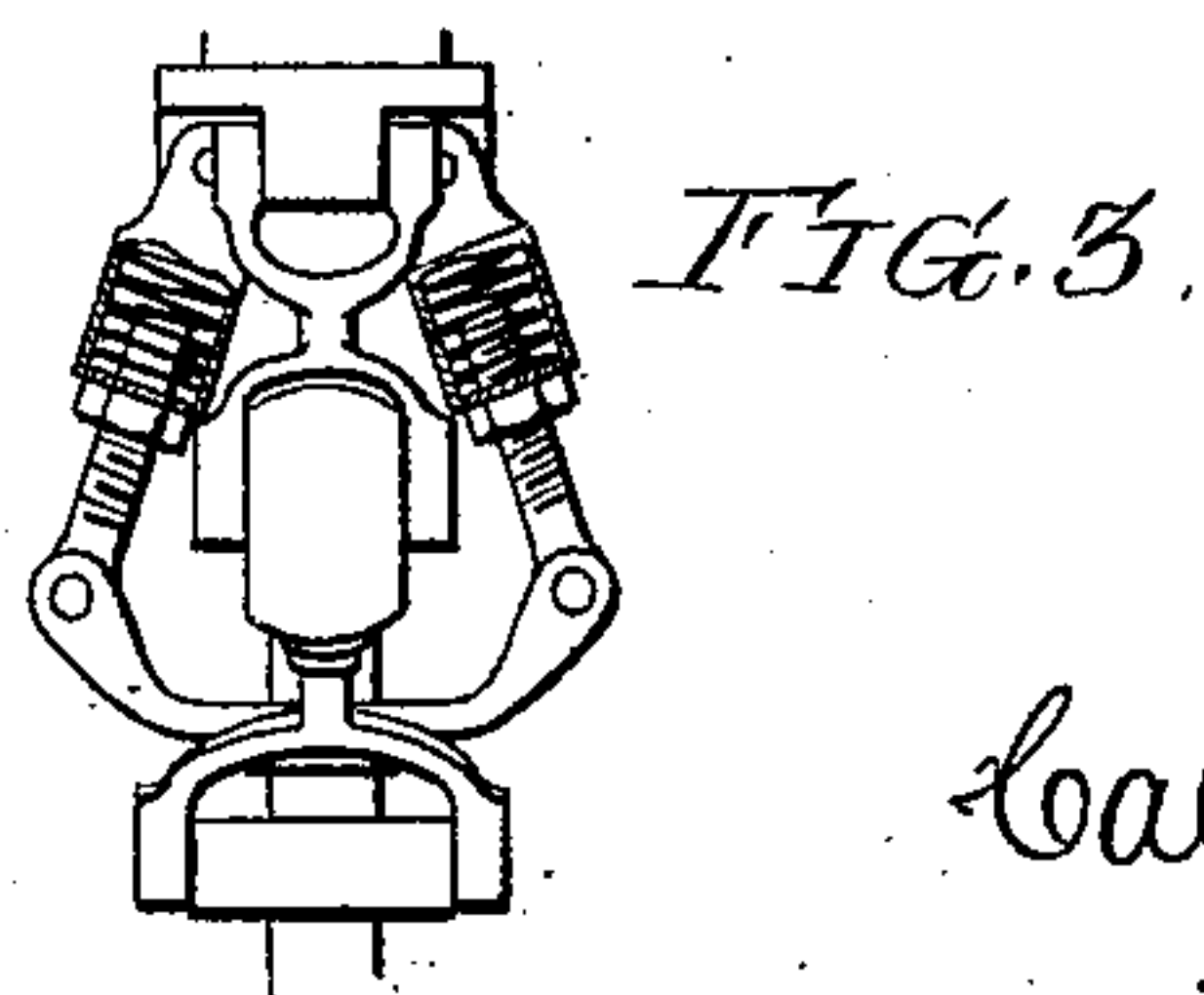
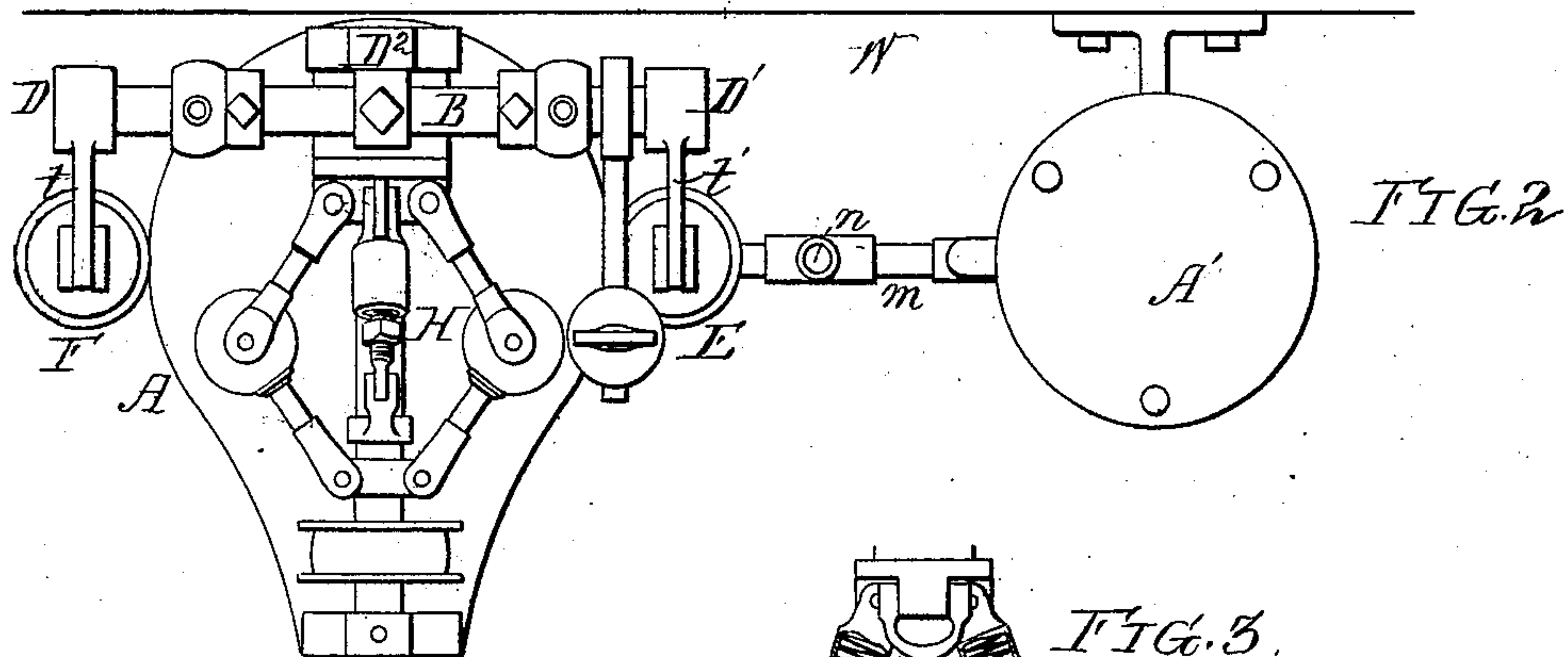
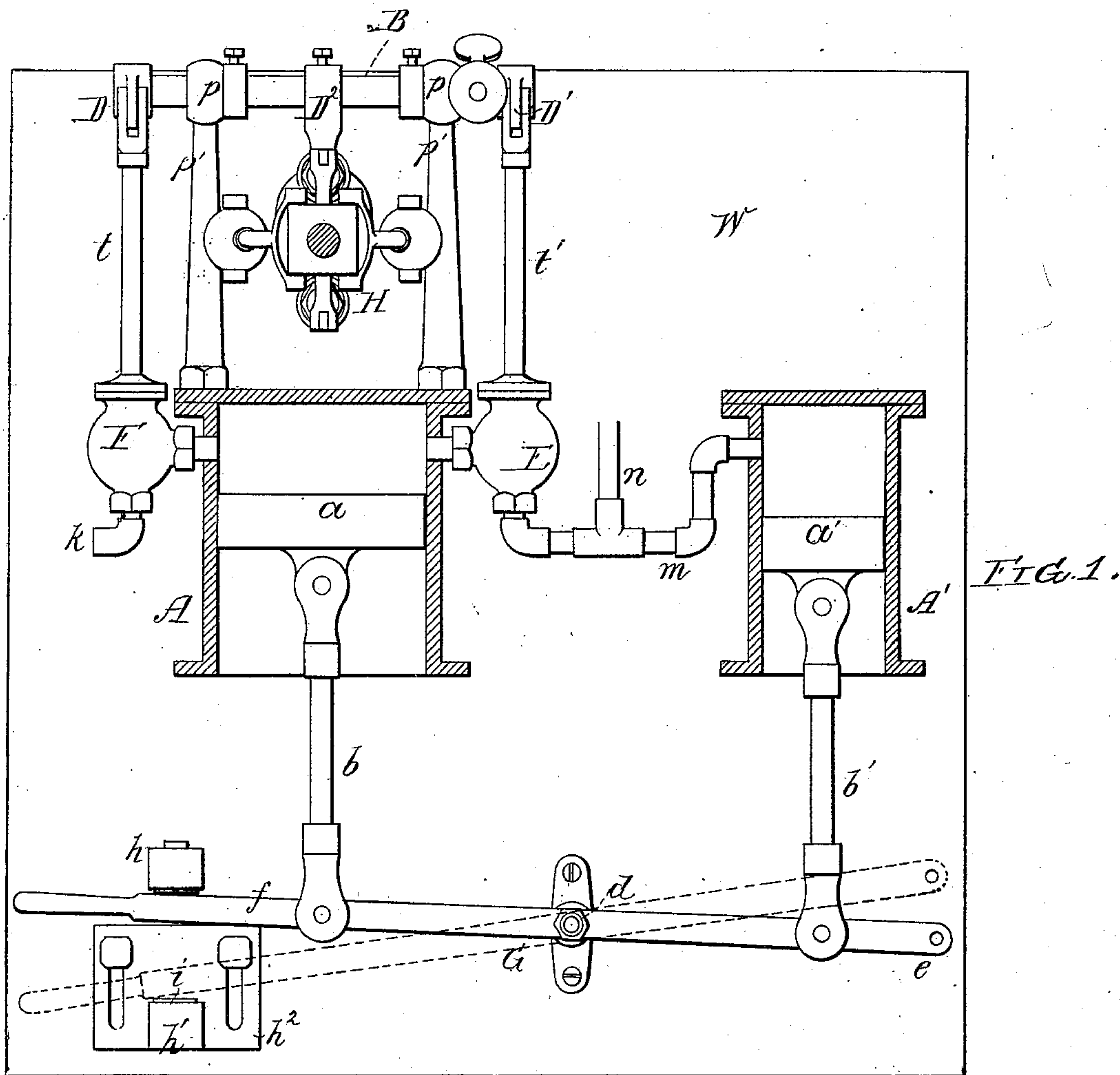


C. C. JENKINS.  
 Steam-Engine Regulator.  
 No. 204,828.      Patented June 11, 1878.



Witnesses,  
 Harry Smith  
 Thomas McAvam

Inventor,  
 Caldwell C. Jenkins  
 by his Attorneys  
 Howson & Co.



# UNITED STATES PATENT OFFICE.

CALDWELL C. JENKINS, OF PHILADELPHIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO CHARLES B. LEE, OF WEST CHESTER, PENNSYLVANIA.

## IMPROVEMENT IN STEAM-ENGINE REGULATORS.

Specification forming part of Letters Patent No. 204,828, dated June 11, 1878; application filed March 18, 1878.

*To all whom it may concern:*

Be it known that I, CALDWELL C. JENKINS, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Regulating Devices for Steam-Engines, of which the following is a specification:

The object of my invention is to regulate the speed of steam-engines, and especially of marine engines, by the devices described hereinafter, so that, although the duty of the governor is light, there shall be a prompt action of the heaviest throttle-valve in obedience to the governor.

In the accompanying drawing, Figure 1 is a front view, partly in section, of my improved regulating device for steam-engines; Fig. 2, a plan view of the same, and Fig. 3 a sectional view of the governor proper.

A and A' are two cylinders, the former of larger diameter than the latter. The pistons *a a'* of these cylinders are connected, by rods *b b'*, to a lever, G, which is pivoted at *d* to the plate W, or to any fixed frame-work. One end, *e*, of this lever is connected to the throttle-valve of a steam-engine, the other end, *f*, passing between two stops, *h h'*, the former of which may be secured to the plate W, or to any fixed object, the stop *h'* forming part of a plate, *h''*, which is so secured to the said plate W or other frame as to be adjustable from or toward the stop *h*. Each stop is recessed to receive a pad, *i*, of rubber, leather, or other like material, for the lever G to strike against during its operations.

Two valve-chests, E and F, are secured to and communicate with the cylinder A above its piston *a*, the valve-chest F having an outlet or exhaust pipe, *k*, and the valve-chest E communicating, through a pipe, *m*, with the small cylinder A' above its piston, and also with a pipe, *n*, which communicates with a steam-boiler.

To bearings *p p*, forming, in the present instance, parts of pillars *p' p'*, secured to the cover of the cylinder A, is adapted a rock-shaft, B, one arm, D, of which is connected to the spindle *t* of the exhaust-valve in the chest F, another arm, D', being connected to the valve-spindle *t'* of the chest E of the steam-valve, and a third arm, D'', being under the control

of a governor, H, which is of peculiar construction, but which will form the subject of a separate application for a patent, inasmuch as the rock-shaft B may be placed under the control of any governor driven by the engine.

The proper setting of the valves in the chests E and F will be best understood by the following description of the operation of the regulating apparatus. Steam from the boiler is always present in the small cylinder A', above its piston *a'*; and as long as the engines are running at uniform speed there is also a supply of steam under the same pressure in the larger cylinder, the valve of the chest E being open, the valve in the chest F closed, the lever G bearing against the stop *h'*, as shown by dotted lines, and the main throttle-valve, to which the lever is connected, being open to an extent sufficient to admit a proper quantity of steam for driving the engine under ordinary circumstances. Should there be a tendency of the engines to race, which is always the case with marine engines when the propeller rises from the water, there will be an increased speed of the governor corresponding with the increased speed of the engine, and the shaft B will be so moved as to operate the valve in both of the chests E and F, the valve in the chest E being closed, and that in the chest F opened, so that steam will be exhausted from the larger cylinder A above its piston. The result of this will be the sudden depression of the piston of the smaller cylinder and the rising of that of the larger cylinder, and simultaneous with the movement of the two pistons will be that of the lever G to the position shown by plain lines, and the consequent closing of the main throttle-valve. Should the speed of the engines be suddenly diminished, the steam-valve will, owing to the action of the governor, be suddenly opened and the exhaust-valve closed, when the steam, acting on the piston of the larger cylinder, will restore the lever G to its former position, as indicated by dotted lines, and the main throttle-valve will be opened to the desired extent.

The above description refers to the action of the regulating apparatus under a very sudden increase of the speed of the engine and a very sudden decrease of the speed. A gradual in-



crease of speed will result in the gradual opening of the exhaust-valve, and a gradual depression of the piston of the small cylinder, and consequently the closing of the main throttle-valve, will be correspondingly gradual. When the diminution of speed of the engines is gradual, the closing of the exhaust-valve and opening of the steam-valve, and the movement of the pistons and opening of the throttle-valve, will be accordingly gradual; in fact, the movements of the pistons and of the throttle-valve will be in exact accordance and almost simultaneous with the requirements of the engines.

It has not been deemed necessary to exhibit the character of the valves used, as different kinds of valves—even a slide-valve—might be employed in connection with the larger cylinder; but I prefer to use the ordinary cylindrical balanced valves, as they can be operated at the expense of less exertion by the governor than any other.

The object of the stops  $h$   $h^1$  will be apparent. I claim as my invention—

1. A regulating device in which a cylinder having steam and exhaust valves under the control of a governor, for admitting steam to and exhausting it from the cylinder on one side of its piston, is combined with a smaller cylinder having a provision for maintaining a constant supply of steam on one side of its piston, and with devices by which the simultaneous movement of the two pistons is communicated to the main throttle-valve of an engine, all substantially as set forth.

2. The combination of the cylinders, pistons, and lever G with the stops  $h$   $h^1$ .

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CALDWELL C. JENKINS.

Witnesses:

HARRY A. CRAWFORD,  
HARRY SMITH.