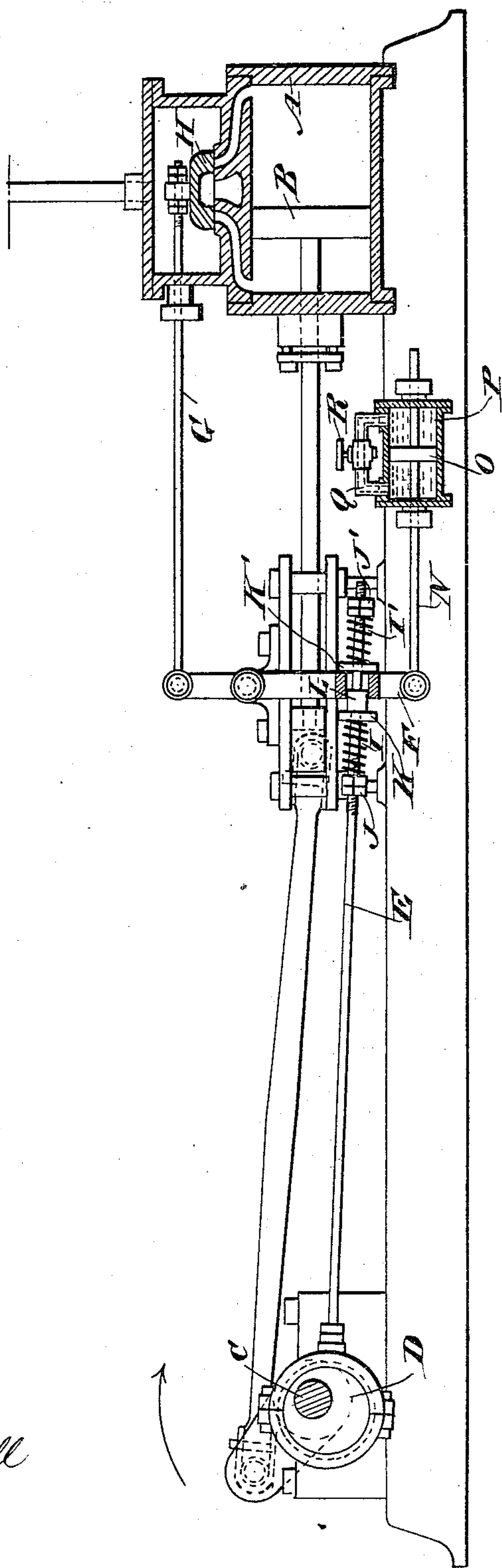


(No Model.)

F. E. SMITH.  
VALVE GEAR.

No. 481,072.

Patented Aug. 16, 1892.



WITNESSES:

*Donn Twitchell*  
*to Sedgwick*

INVENTOR:

*F. E. Smith*  
BY *Munn Ho*  
ATTORNEYS

# UNITED STATES PATENT OFFICE.

FRED. ELLIS SMITH, OF BOSTON, MASSACHUSETTS.

## VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 481,072, dated August 16, 1892.

Application filed November 13, 1891. Serial No. 411,785. (No model.)

*To all whom it may concern:*

Be it known that I, FRED. ELLIS SMITH, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and Improved Valve-Gear, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved valve-gear, which is simple and durable in construction, very effective in operation, and arranged to govern the movement of the valve in such a manner as to prevent racing of the engine and to give a constant uniform motion to the main driving-shaft.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawing, forming a part of this specification, in which the figure represents a sectional side elevation of the improvement as applied.

The engine shown in the drawing, of the ordinary kind, is provided with a cylinder A, containing a piston B, connected in the usual manner with the main driving-shaft C, carrying an eccentric D, having its eccentric-rod E, connected with the rocker F, connected with the valve-stem G, carrying the valve H. On the eccentric-rod E, at opposite sides of the rocker F, are coiled springs I and I', resting at their outer ends on nuts J and J', respectively, held adjustably on the eccentric-rod E. The inner ends of the springs I and I' press on washers K and K', respectively, adapted to press on opposite sides of the rocker F and arranged to be engaged alternately on the forward and backward motion of the eccentric-rod E by a collar L, secured on the eccentric-rod E and fitted to slide in the rocker F. The lower end of the latter is connected with a piston-rod N, carrying a piston O, mounted to travel in the cylinder P, containing a fluid, preferably oil. The ends of the cylinder P are connected with each other by a pipe or passage Q, containing a valve R for regulating the amount of fluid passing from one end of the cylinder to the other in a given time.

It will be seen that when the engine is run-

ning the movement of the rocker F is controlled by the speed with which the fluid passes from one end of the cylinder P to the other, so that the valve H always travels at a constant rate of speed irrespective of the racing tendencies of the engine. It will further be seen that the motion of the eccentric-rod E imparts a swinging motion to the rocker F; but the motion is transmitted by the movement of the springs I and I', so that a yielding connection is made between the eccentric and the rocker F to permit the fluid to pass from one end of the cylinder to the other in a given time.

It is understood that the piston O may be directly attached to the valve-stem G or connected with the latter in a different manner from the one shown and described. It is understood that the main or slide valve can travel only as fast as the fluid in the cylinder P is allowed to pass through the pipe Q past the regulating-valve R, so that by adjusting the latter the speed of the valve H can be regulated as desired. It will further be seen that in case the load is suddenly removed from the main driving-shaft C, as in case of marine engines where the propeller moves out of the water, the valve H quickly cuts off to prevent the engine from racing.

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

1. A valve-gear comprising a rocker yieldingly connected with its eccentric-rod, and a stationary auxiliary fluid-cylinder having connected ends, and a piston operating in said cylinder and connected with the valve-stem, substantially as set forth.

2. In a valve-gear, the combination, with an eccentric and its rod, of a fixed collar held on the said rod, springs coiled on the said rod and pressing against washers adapted to be engaged by the said collar, and a rocker connected with the main valve and adapted to be engaged at opposite sides by the said washers, substantially as shown and described.

3. In a valve-gear, the combination, with a valve-stem, of a cylinder containing a piston connected with the said valve-stem, a fluid contained in the said cylinder, a pipe con-

necting the ends of the cylinder with each other, and a regulating-valve in the said pipe, substantially as shown and described.

4. In a valve-gear, the combination, with an  
5 eccentric and a rocker yieldingly connected with the said eccentric, of a cylinder having connected ends and filled with a fluid, a piston mounted to travel in the said cylinder

and connected with the said rocker, and a valve arranged in the pipe for connecting the 10 ends of the cylinder, substantially as shown and described.

FRED. ELLIS SMITH.

Witnesses:

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SAML. F. DAVEY.