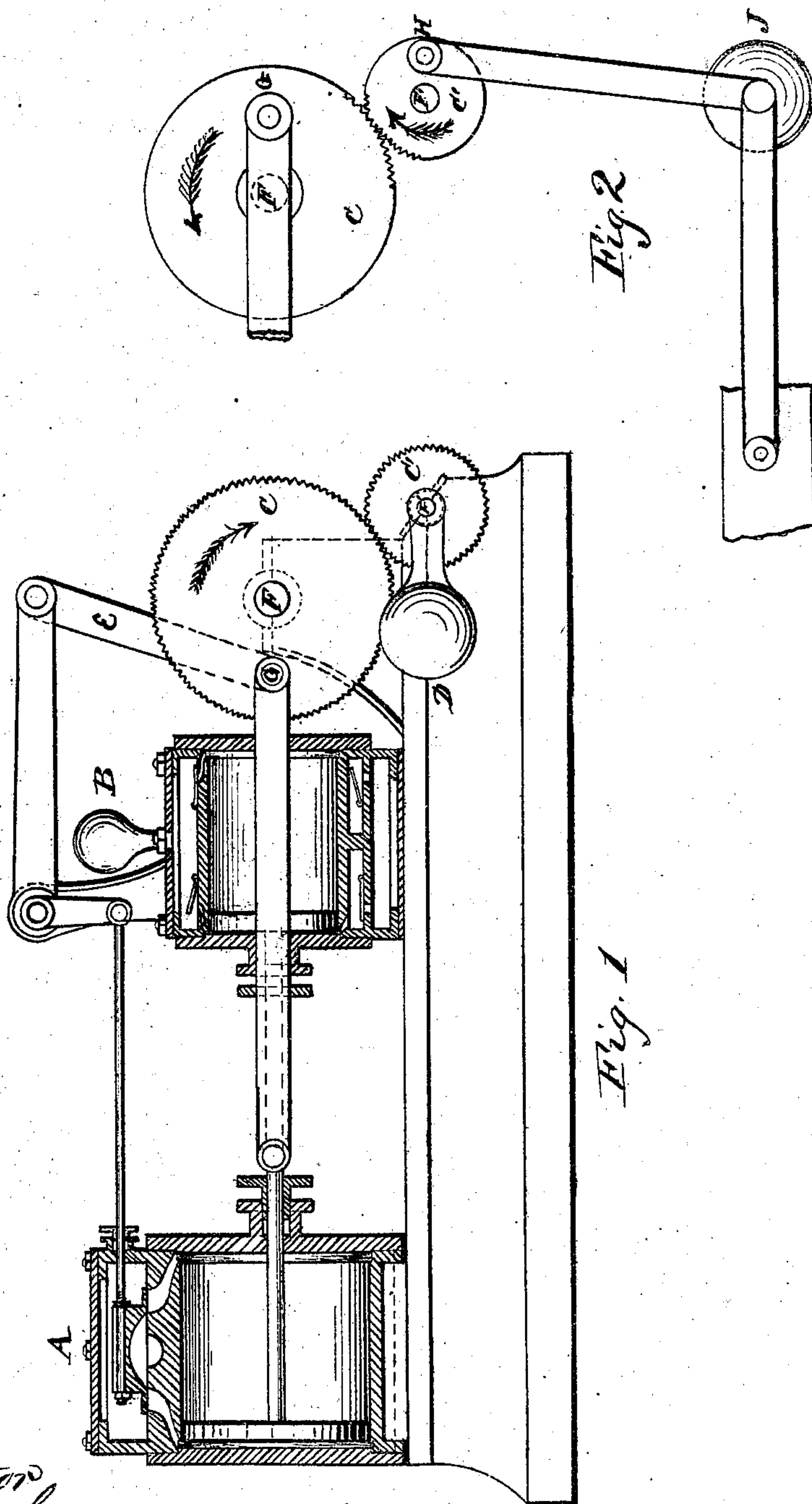


W. C. HICKS.  
Steam-Pumping Engines.

No. 143,824.

Patented Oct. 21, 1873.



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# UNITED STATES PATENT OFFICE.

WILLIAM CLEVELAND HICKS, OF SUMMIT, NEW JERSEY.

## IMPROVEMENT IN STEAM PUMPING-ENGINES.

Specification forming part of Letters Patent No. 143,824, dated October 21, 1873; application filed May 25, 1871.

*To all whom it may concern:*

Be it known that I, WILLIAM CLEVELAND HICKS, of Summit, New Jersey, have invented a new and useful Improvement in Pumping-Engines; and the following is a full, clear, and exact description and specification of the same.

The object of my invention is, primarily, to so construct a pumping-engine having a crank motion that it may be more positive in its action, deliver water or other fluid more uniformly, and so that it may be always ready to start by the application of force to the pistons, and avoiding the dead-points usual in crank pumping-engines when the pistons are at the head of their cylinders or at the centers of the crank, so called. To this end my invention consists of certain combinations of steam cylinder and piston, valve, and piston rod with the water-cylinder, piston-valves, and piston-rod, and the crank and crank-shaft, when the latter are connected with gears and weights or springs in the manner substantially as hereinafter described and specified.

My invention is applicable to various forms of pumping-engines having steam-cylinders, water-cylinders, and cranks combined; and I will proceed to describe one form to which I have applied my improvement.

Figure 2 represents a steam pumping-engine in section, A showing the steam-cylinder cut through longitudinally and vertically, and the piston, piston-rod, valve, and the valve-rod, levers, &c., driven by the main crank to give proper motions to the valve. It shows the water-cylinder, valves, piston, and piston-rod joined to the steam piston-rod, and both connected, by connecting-rods, to the main crank G in the usual manner; and, as all the parts are made as constructed, and connected in the usual manner, it is not necessary to describe them more fully. To the crank-shaft F, Fig. 2, is attached a gear, C, and to the small shaft F' is attached a gear having half the number of teeth as the gear C, consequently making two revolutions every time the crank-shaft makes one. It may have one-quarter or one-eighth the number of teeth, and partially produce the result aimed at; but I prefer the proportions shown. To the shaft F' is attached a lever or disk, having at the end a weight, D, so situated in reference to the crank G that when the crank-pin is moving over the quarter of its revolution divided by the dead-point of the crank, one-eighth above and one-eighth below the horizontal line, the weight D is falling from its highest point to its lowest, caus-

ing the crank to pass through said quarter of its motion positively without the assistance of the force applied to the pistons. The force applied to the pistons, however, through the crank and gears, compels the weight to rise during the two quarters of the crank revolution where the pistons have their most direct action. The motion of the pistons thus is made more uniform, and the water is pumped in a more continuous stream, as the weight falling increases the speed of the crank over its centers. As the weight always tends to fall, the crank will not stop on its centers, and the steam-valve will be always open in one direction or the other, and so the pump will always start when steam is applied.

Fig. 1 represents the same combination, using a connecting-rod and crank-pin, H, with the weight at J. A spring or air piston, or any other equivalent attachment, may be used to effect the purpose.

Having sufficiently described the improvement, what I claim is—

1. The combination, substantially as set forth, of a steam-cylinder, with its piston, piston rod and valve, and valve apparatus; a water-cylinder, with its valves, piston, and piston-rod connected with said steam-piston and piston-rod; a crank, and a continuously-revolving crank-shaft, provided with a toothed gear, with a counter-shaft provided with a pinion having one-half the number of teeth meshing into said gear in the said main crank-shaft, and also provided with a crank to which is connected a weight or spring, in such a manner as to cause the crank on the main shaft to pass over its centers, substantially in the manner described.

2. The combination, substantially as herein described, of a reciprocating piston-rod, connected to a crank on a revolving crank-shaft provided with a toothed gear, with a counter-shaft provided with a pinion having one-half the number of teeth meshing into said gear on the main crank-shaft, and also provided with a crank to which is connected a spring or other elastic force, in such manner that the said spring is strained by the revolution of the main shaft, and exerts its force in the opposite direction to cause it to pass its centers twice each revolution, substantially as herein set forth.

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