

(No Model.)

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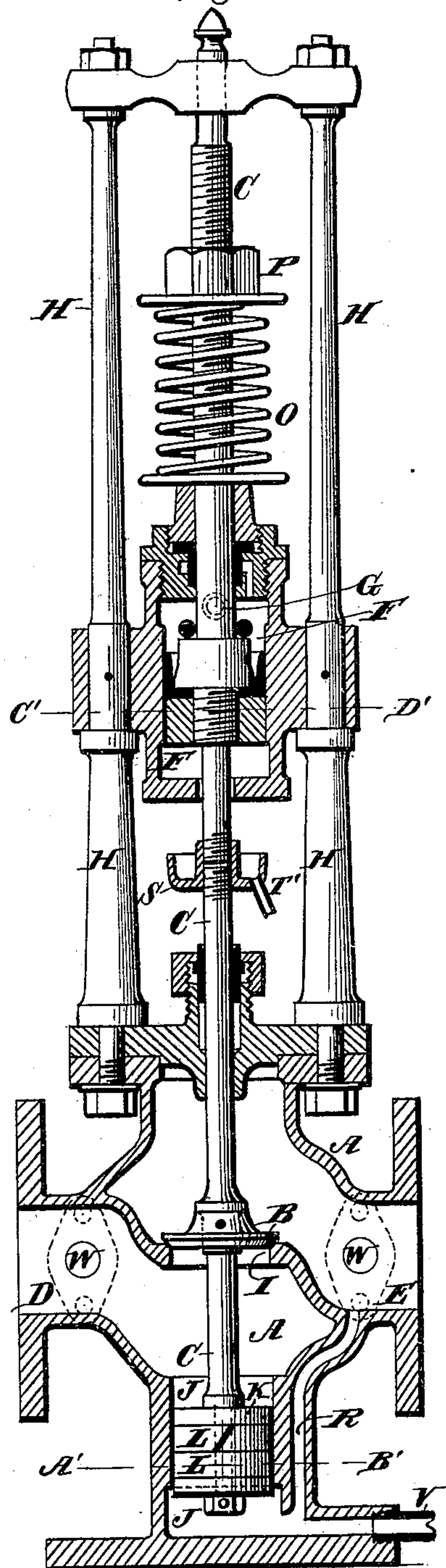
E. KNOWLES.

VALVE MECHANISM FOR AUTOMATICALLY STARTING STEAM PUMPS.

No. 395,908.

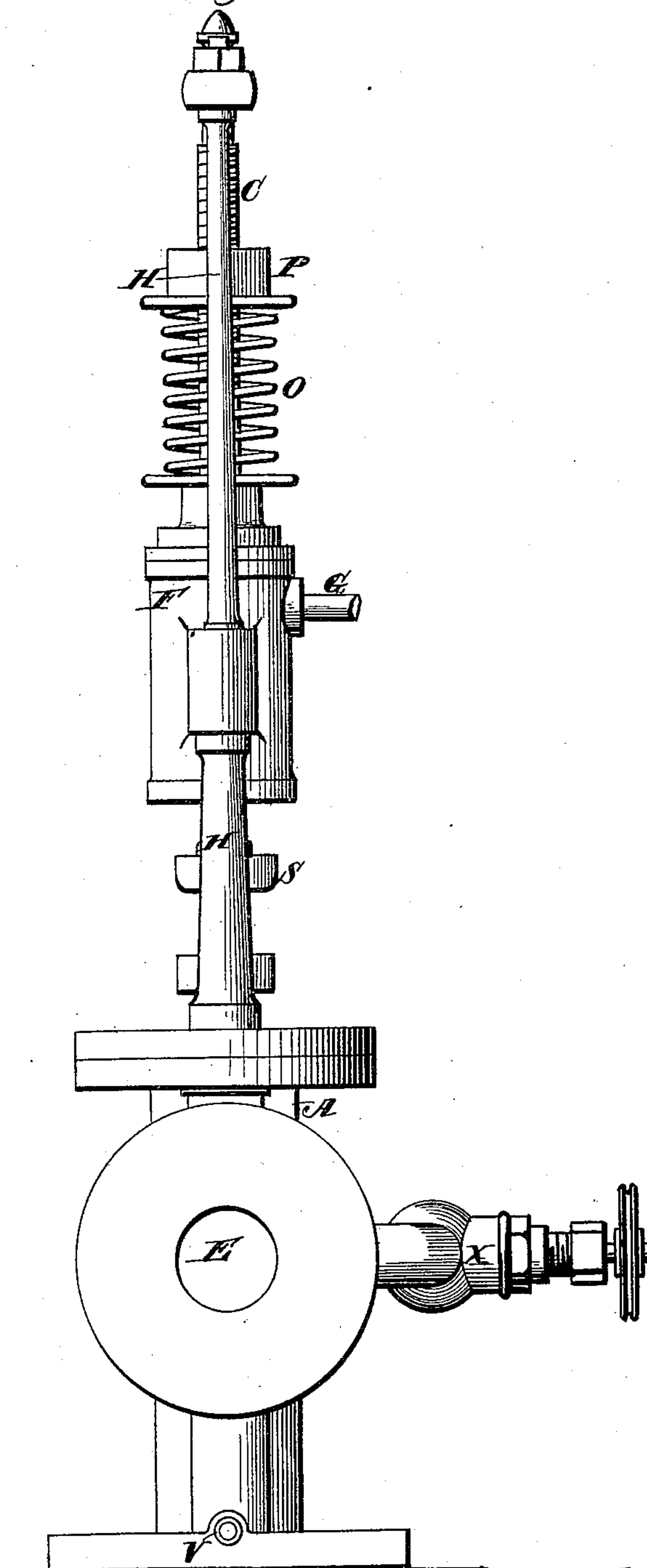
Patented Jan. 8, 1889.

*Fig. 1.*



*Witnesses.*  
*Phot. Smith.*  
*Percy B. Hills.*

*Fig. 2.*



*Inventor.*  
*Ernest Knowles.*  
*By James L. Norris.*  
*Atty.*

(No Model.)

2 Sheets—Sheet 2.

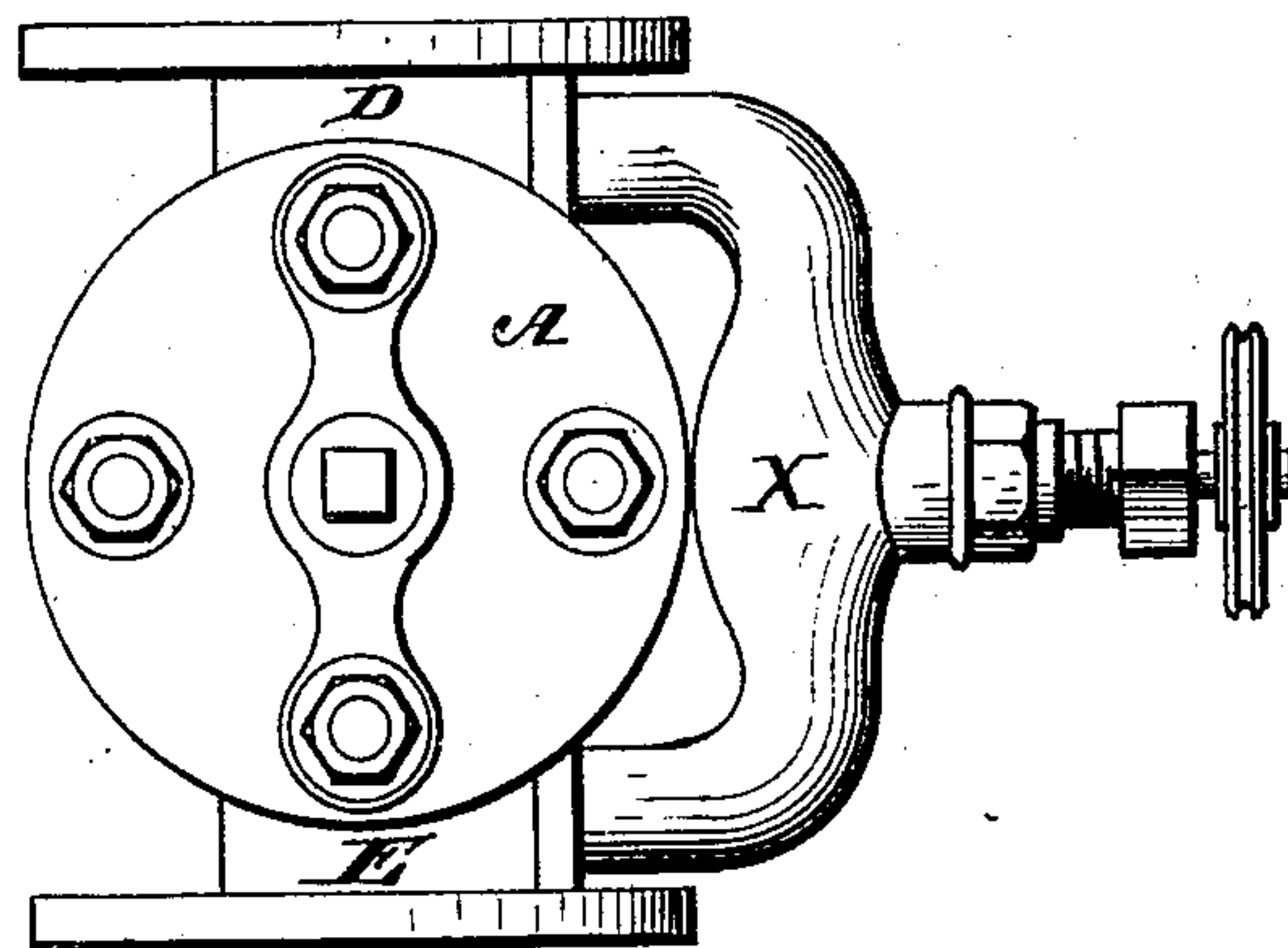
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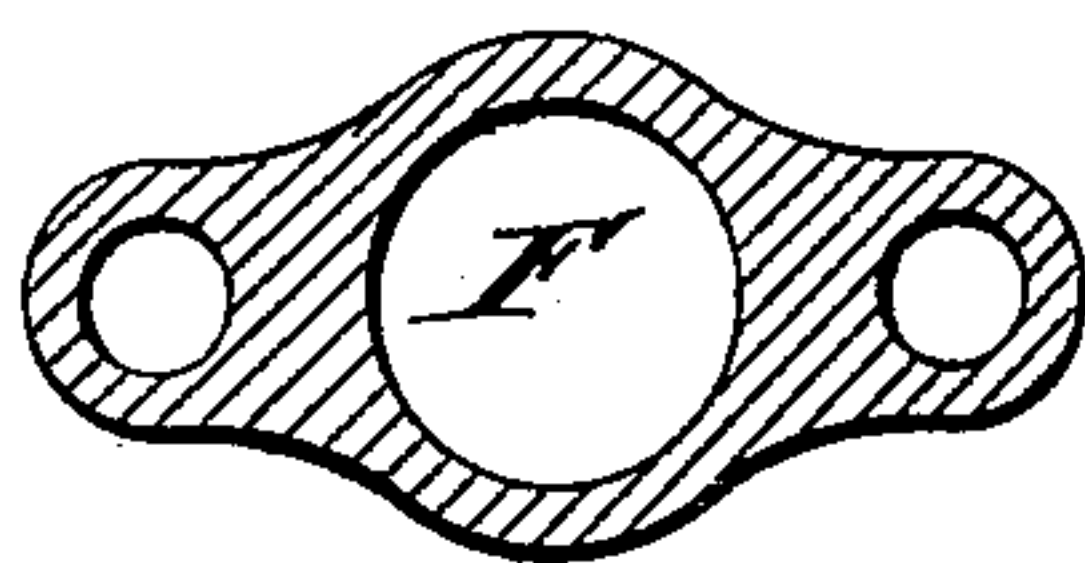
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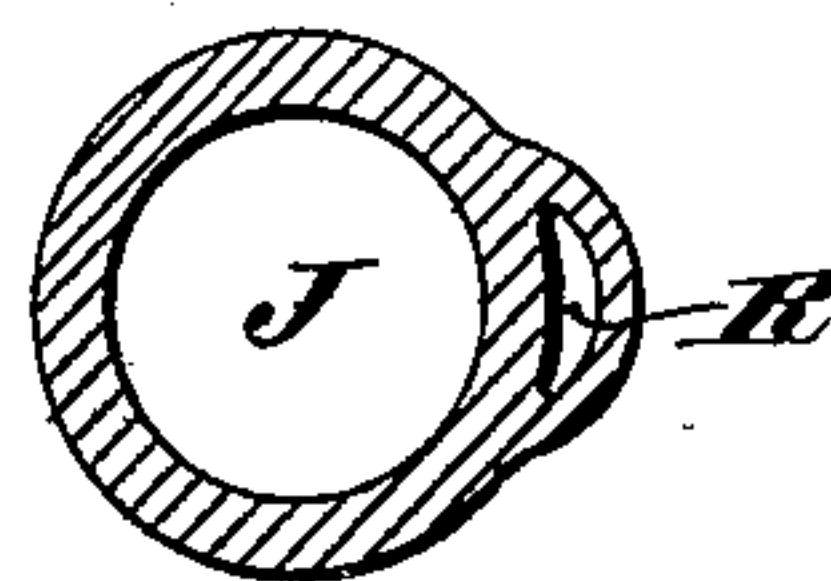
*Fig. 3.*



*Fig. 5.*



*Fig. 4.*



*Witnesses.*

*Robert Enatt.*

*Leroy B. Hills.*

*Inventor.*

*Ernest Knowles.*

*By*

*James L. Norrie.*

*Atty.*



# UNITED STATES PATENT OFFICE.

ERNEST KNOWLES, OF MOSSFIELD MILL, BOLTON, COUNTY OF LANCASTER,  
ENGLAND.

## VALVE MECHANISM FOR AUTOMATICALLY STARTING STEAM-PUMPS.

SPECIFICATION forming part of Letters Patent No. 395,908, dated January 8, 1889.

Application filed July 21, 1888. Serial No. 280,596. (No model.) Patented in England April 5, 1888, No. 5,072.

*To all whom it may concern:*

Be it known that I, ERNEST KNOWLES, cotton-spinner, of Mossfield Mill, Bolton, in the county of Lancaster, England, a subject of the Queen of Great Britain, have invented new and useful Improvements in Valve Mechanism for Automatically Starting Steam-Pumps, (for which I have obtained a patent in Great Britain, No. 5,072, dated April 5, 1888,) of which the following is a specification.

This invention has for its object to provide novel mechanism for automatically starting a Worthington or other pump by the reduction of liquid pressure in a hydraulic cylinder designed to connect with a system of sprinklers or like devices which distribute a fire-extinguishing liquid. This object I accomplish in the manner and by the means hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a vertical sectional elevation of the valve mechanism illustrating my invention. Fig. 2 is a side elevation of the same; Fig. 3, a plan view; Fig. 4, a section on the line A' B', Fig. 1; Fig. 5, a section on the line C' D', Fig. 1.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein—

The letter A indicates the valve-casing; B, the valve; I, the valve-seat; C, the valve-spindle; D, the inlet branch; E, the outlet branch; F, the hydraulic cylinder connected to the sprinkler-installation by the pipe G.

H H are standards for carrying the hydraulic cylinder and other parts from the valve-casing A, by which the whole is self-contained.

The valve-casing A is provided with the steam-cylinder J under the valve B and seat I, which is equal in area to the diameter of the under side of the valve B when the latter is closed, by which a perfect equilibrium is obtained. The cylinder J is fitted with the piston K, coupled to the bottom end of the valve-spindle C. The piston K can be fitted with the rings L, which are operated by internal springs to insure the same being perfectly steam-tight. Any other kind or make of piston may be employed. On the upper side of

the hydraulic cylinder F is mounted the spring O, operated upon or compressed by the nut P on the spindle C.

This invention operates as follows: In setting this apparatus the steam-valve B is held down upon its seat I by the pressure in the sprinkler-installation being imparted to the top side of the hydraulic piston M in the cylinder F, the same being supplied by the pipe G. Immediately the pressure in the sprinkler-installation is reduced by the sprinklers coming into action or other causes the pressure is reduced proportionately in the hydraulic cylinder F, and when the same is reduced sufficiently to allow the spring O to overcome it the steam stop-valve B is opened and steam is admitted through the same from the inlet branch D to the outlet branch E, the latter communicating with the under side of the piston K by means of the by-pass R, by which the piston K and valve B are placed in equilibrium, thus allowing of the spring O maintaining the stop-valve B in an open position to supply the necessary steam to drive the pump supplying the sprinkler-installation with water or liquid. The valve-spindle C is in two parts, the ends being screwed and connected by the nuts S, which forms a drip-dish to receive water or liquid that may escape from the under side of the hydraulic cylinder F, the water or liquid being conducted therefrom by the drip-pipe T' to any convenient position or place. Condensed steam or water is conducted from the under side of the steam-piston K by the pipe V, which may be connected to a steam-trap or its equivalent.

Owing to a regulation enforced by fire-insurance companies, it is absolutely necessary that the Worthington or other pump be kept constantly on the move to insure the same starting when necessary, or, in the case of a rotary engine or engines, to keep the cylinder or cylinders warm, so as to avoid breakage or accident when suddenly called into action. This regulation entails the supply of a small quantity of steam continually. This I accomplish without opening the stop-valve B by providing the inlet and outlet passages with the openings W and connecting the same by the valve X, as shown in Figs. 2 and 3.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

The combination of a valve-casing having a projecting steam-cylinder and provided with an inlet and outlet, a valve-seat and a by-pass connecting the outer end of the steam-cylinder with the steam-outlet, a steam-packed piston in the steam-cylinder, a hydraulic cylinder located adjacent to the valve-casing and having a liquid-supply pipe for connecting with liquid-distributing sprinklers, a piston in the hydraulic cylinder moved by the liquid pressure therein, a valve-spindle connected with the piston in the hydraulic cylinder, having a valve to close on the valve-seat and extending through the valve-seat to

the piston in the steam-cylinder, and a spring acting on the valve-spindle to move the valve from its seat when the pressure in the hydraulic cylinder is reduced for passing steam 20 through the valve-casing to a pump and through the by-pass to the steam-piston, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ERNEST KNOWLES.

Witnesses:

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