No. 673,234. Patented Apr. 30, 1901.

J. L. BOOTHMAN & W. GRAHAM.

CONTROLLING VALVE FOR ENGINES.

(Application filed Jan. 31, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

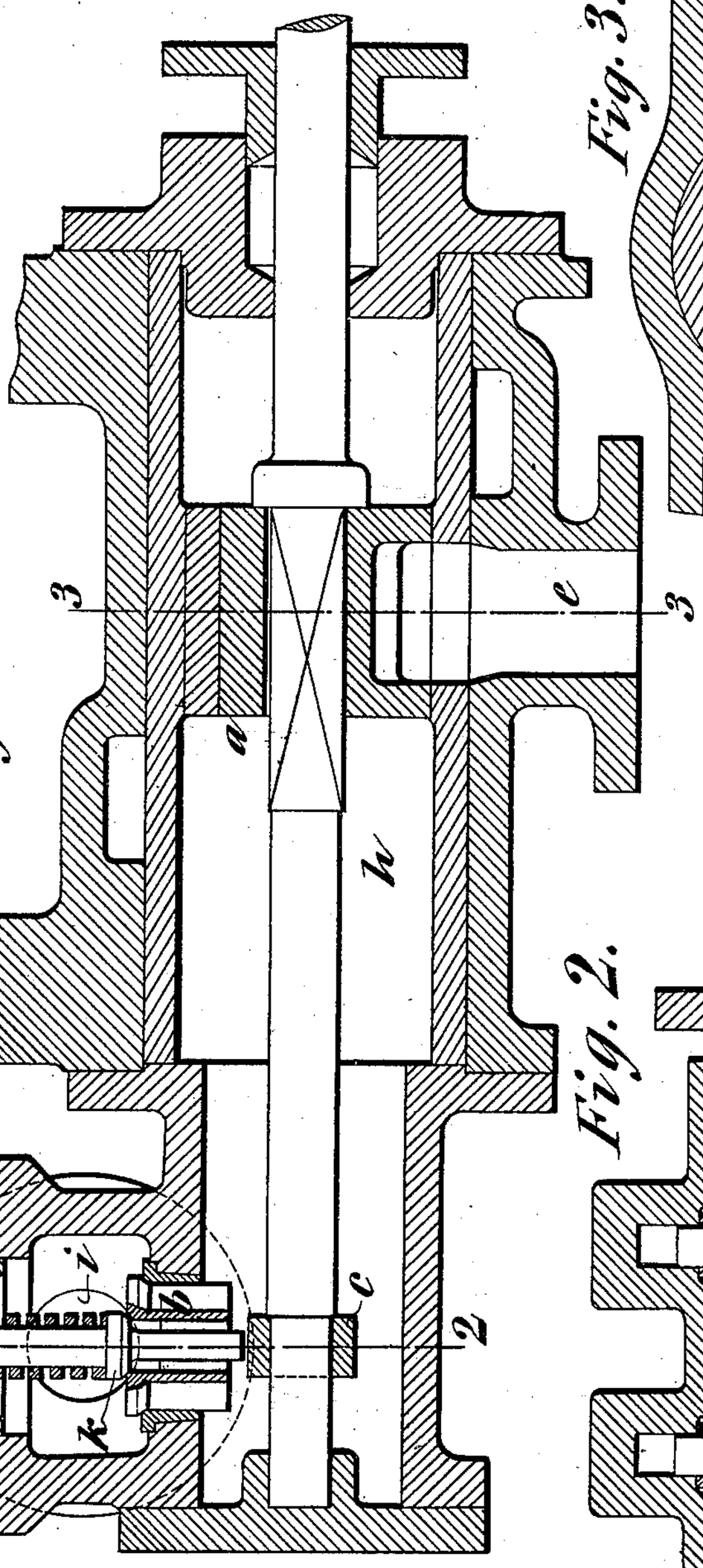

Fig. 3.

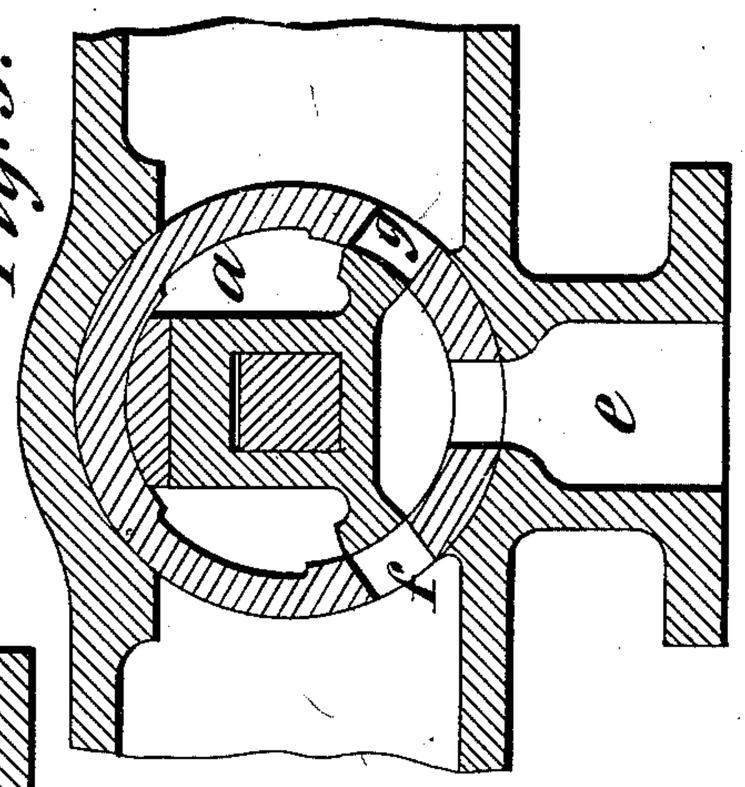

Fig. 2.

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Fig. 4.

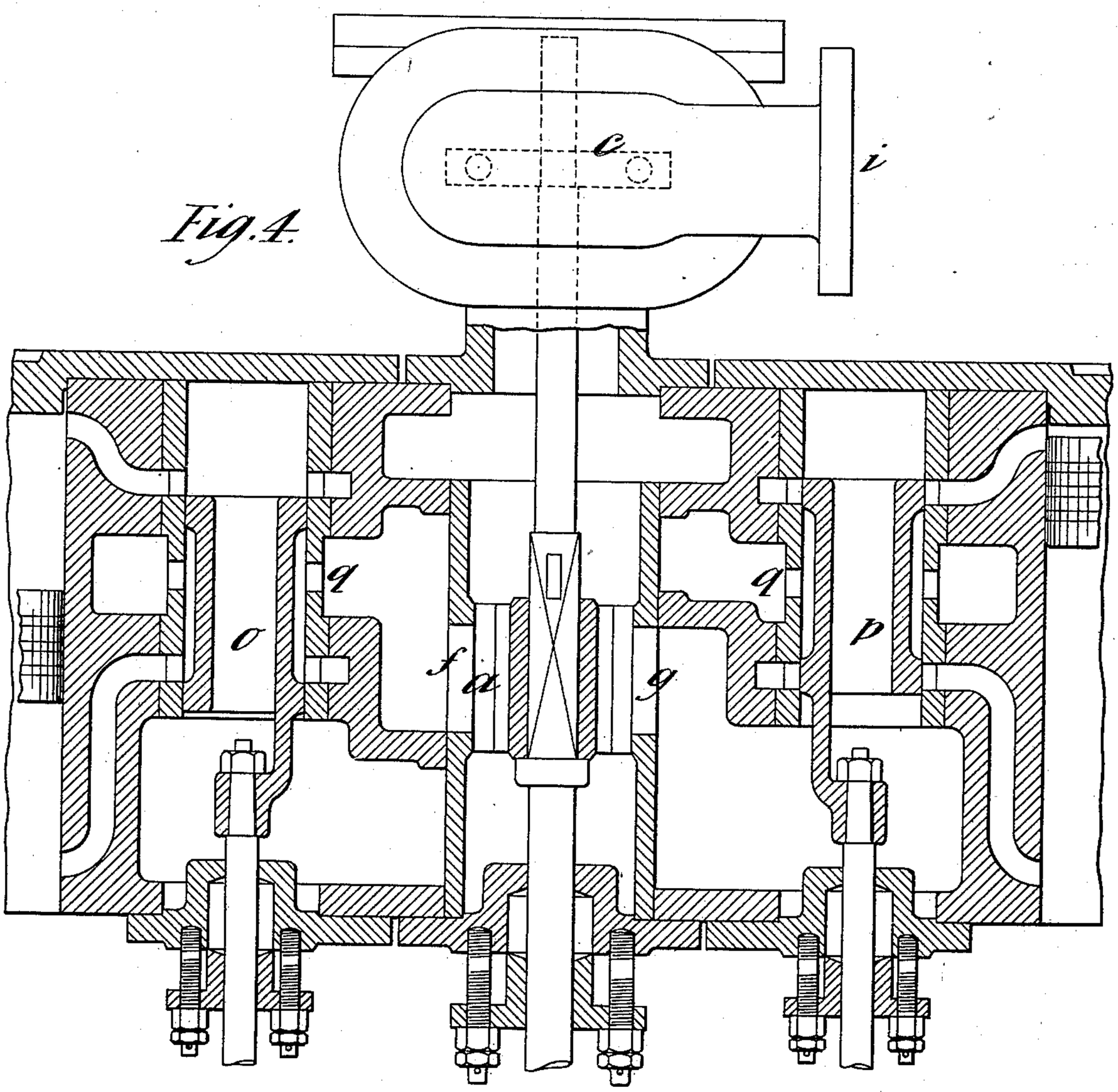

Fig. 5.

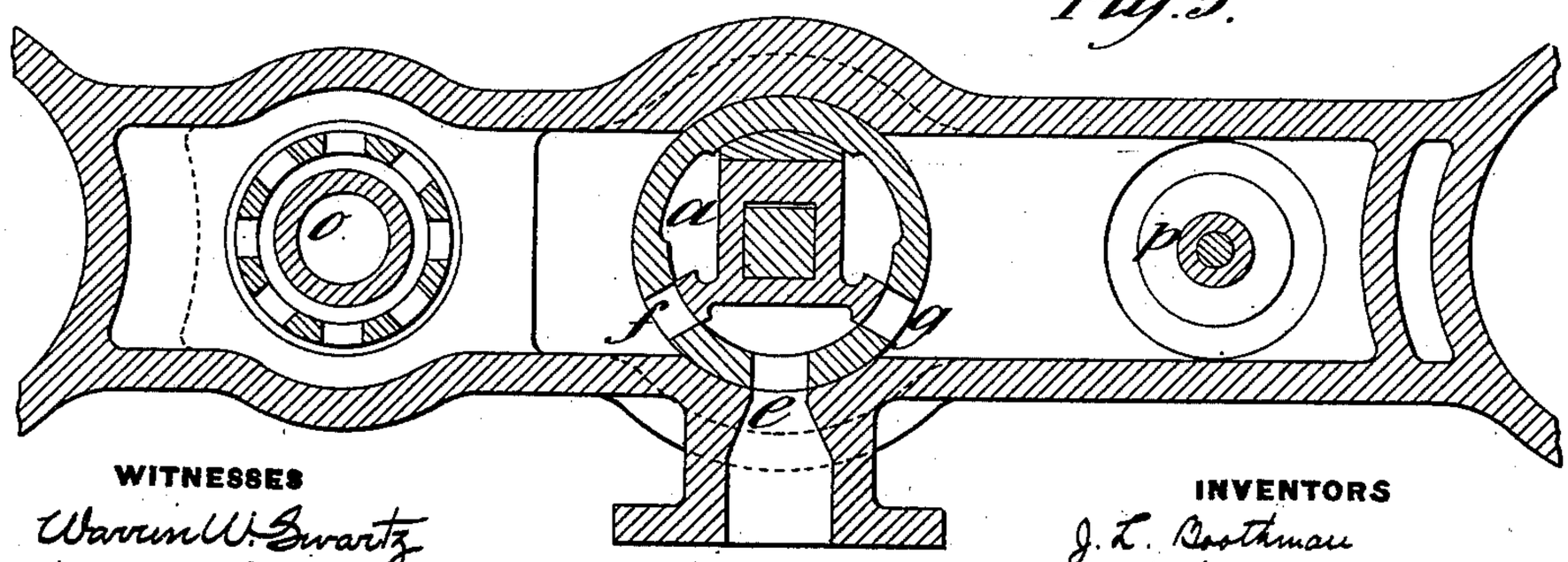

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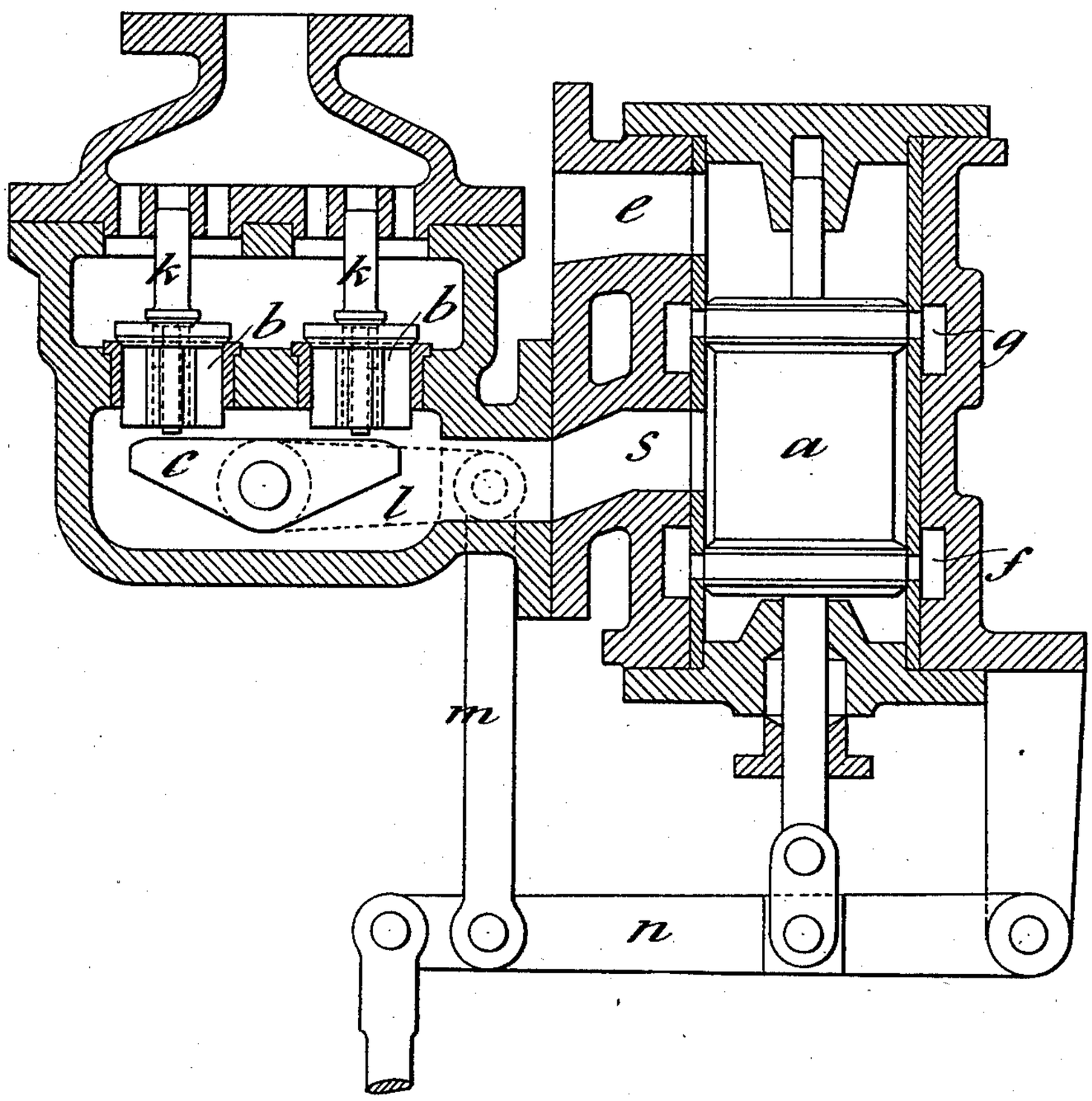
Fig. 6



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UNITED STATES PATENT OFFICE.

JAMES LEWIS BOOTHMAN AND WALTER GRAHAM, OF GREENOCK, SCOTLAND.

CONTROLLING-VALVE FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 673,234, dated April 30, 1901.

Application filed January 31, 1901. Serial No. 45,441. (No model.)

To all whom it may concern:

Be it known that we, JAMES LEWIS BOOTHMAN and WALTER GRAHAM, citizens of Scotland, residing at Kilblain Engine Works, Nicholson street, Greenock, Scotland, have invented a certain new and useful Improvement in Controlling-Valves for Steering and Such Like Engines, (for which we have applied for a patent in Great Britain, dated October 8, 1900, No. 17,851, and in Germany, dated October 22, 1900,) of which the following is a specification.

A controlling-valve for steering or such like engines is sometimes made of a partially-rotating and sometimes of a reciprocating kind governing two ports by the one or other of which steam is admitted to the ordinary slide or other valve of the steering-engine, so as to cause the engine to work in the one direction or the other, according as the one or the other port is open. In order to provide against constant leakage of steam past such a controlling-valve when it is in its middle position, the steering-engine being at rest, we provide a pair of shut-off valves, which prevent steam from entering the casing of the controlling-valve when it is in such middle position, the one or other of these valves being opened only when the controlling-valve is moved to the one side or the other of its middle position. We shall describe an arrangement of this kind, referring to the accompanying drawings.

Figure 1 is a longitudinal section of the casing of a partially-rotating controlling-valve and of the shut-off valve as applied thereto according to our invention. Figs. 2 and 3 are transverse sections on the lines 2 2 and 3 3 of Fig. 1, respectively. Fig. 4 is a plan, mostly sectional; and Fig. 5 is a transverse section showing parts of the two cylinders of a steering-engine and their slide-valves with the controlling-valves arranged between them. Fig. 6 is a section showing our invention applied to a controlling-valve of reciprocating kind.

Referring first to Figs. 1 to 5, inclusive, the controlling-valve *a* works over an exhaust-port *e*, and in its middle position, as shown in Fig. 3, it closes two ports *f g*, leading to the slide or other valves *o p* of the steering-engine. When the valve *a* is partly turned in either direction—say to open *f* to steam—it makes communication through ports *q* with the middle of the slide-valve *o*, while the exhaust *e* is put in communication with the ends of the slide-valves *o p*, and as the slide-valves are hollow the end spaces in the valve-chests communicate with each other. The steering is thus caused to work in the one direction or the other, according as the valve *a* is turned to open *f* or to open *g* to steam. On the spindle of the valve *a* is fixed a two-armed lever *c*, over which are situated two spring shut-off valves *b b*, which in the position shown in Fig. 2 close communication between the steam-inlet *i* and the casing *h* of the controlling-valve; but when the controlling-valve is partly turned in either direction the one or the other arm of the lever *c* raises the one or the other of the shut-off valves *b*, admitting steam to the casing *h*. In order to reduce the strain necessary to unseat either valve *b*, we prefer to make it with an opening through it on which is seated a smaller valve *k*, having its stem somewhat longer than the stem of the valve *b*, so that when the arm of lever *c* is moved upward it first unseats the small valve *k*, allowing steam to pass and partly balance the pressure on the main valve *b*, which is also unseated by the further movement of the lever *c*.

Referring now to Fig. 6, the controlling-valve *a* of the reciprocating kind governs the two ports *f g*. *e* is the exhaust-outlet, and *s* the steam-inlet. In this case the two-armed lever *c*, which works the shut-off valves, is fixed on a rocking shaft, an arm *l* on which is connected by a link *m* to the lever *n*, which works the controlling-valve *a*. When the valve is in middle position, the shut-off valves *b b* are both closed. When it is moved either way from the middle position, the one or the other of the shut-off valves is opened, allowing steam to pass to the controlling-valve and thence by the one or the other of the ports *f g*, while exhaust from the other port passes to the outlet *e*. It is to be understood that there are longitudinal passages for exhaust through the valve *a*.

Having thus described the nature of this

invention and the best means we know of carrying the same into practical effect, we claim—

1. The combination with a controlling-valve for a steering or similar engine, of a pair of shut-off valves controlling the fluid-supply to the control-valve, and connections between the controlling-valve and the shut-off valve arranged to open one of them whenever the control-valve is moved from its middle position; substantially as described.

2. In combination with a controlling-valve for a steering or such like engine, a two-armed lever fixed on a spindle moved with the valve and a pair of shut-off valves arranged over the arms of the lever so that the one or the other of these is opened when the controlling-valve is moved from its middle position, substantially as and for the purpose set forth.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

JAMES LEWIS BOOTHMAN.
WALTER GRAHAM.

Witnesses:
ALEXANDER PLANT,
FREDERICK HILL.