

(Model.)

W. FOLEY.
PISTON VALVE.

No. 252,449.

Patented Jan. 17, 1882.

Fig 1.

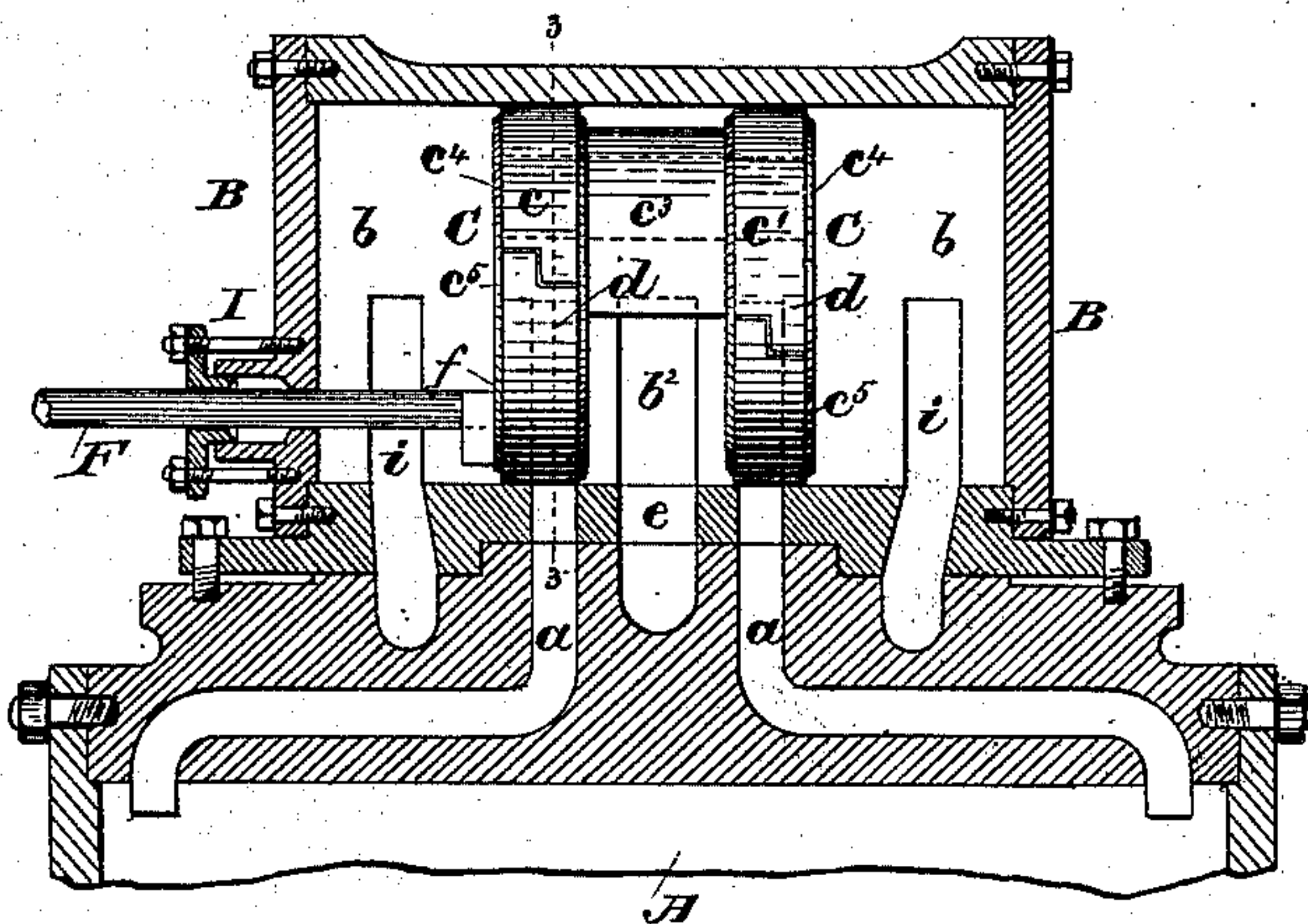


Fig 2.

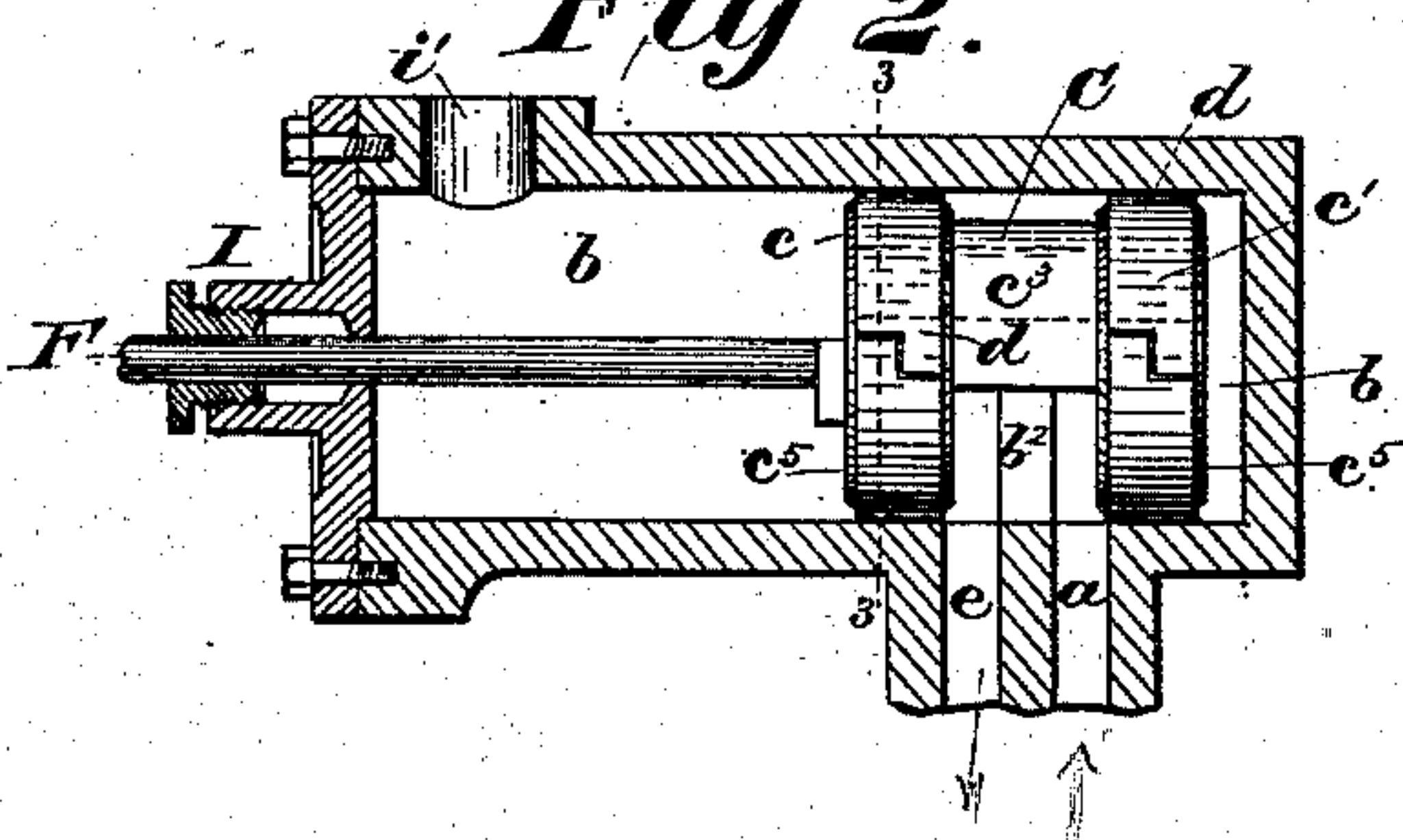


Fig 3.

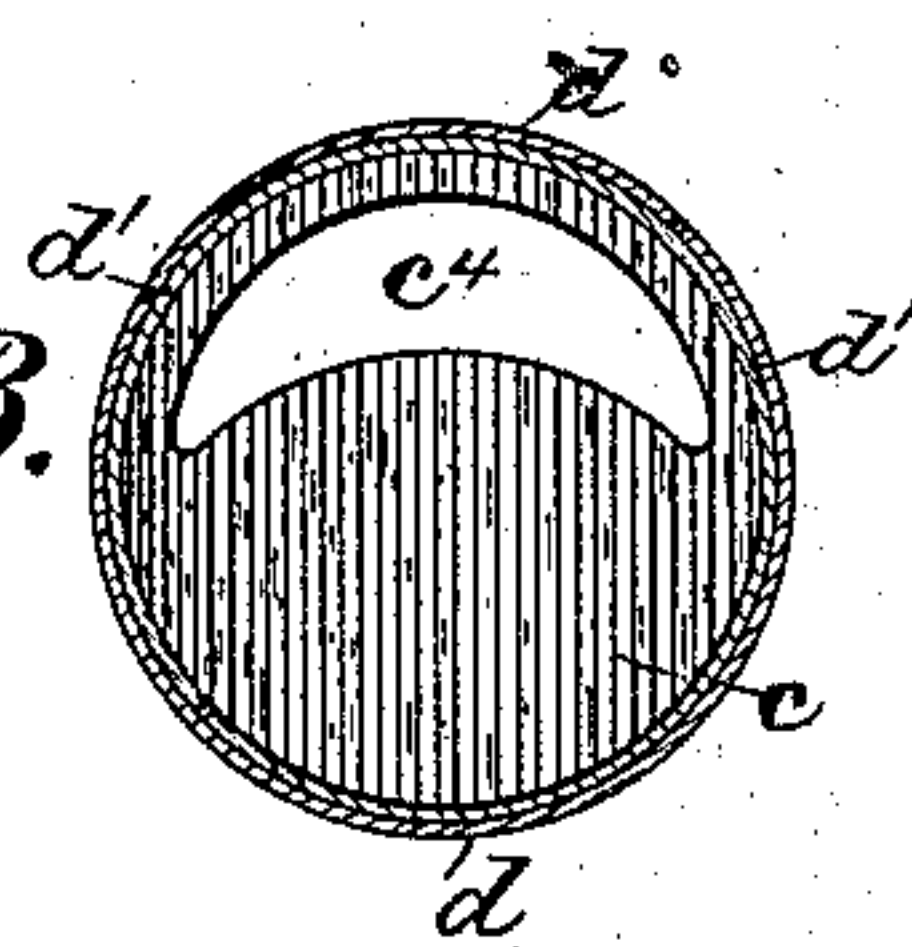


Fig 4.

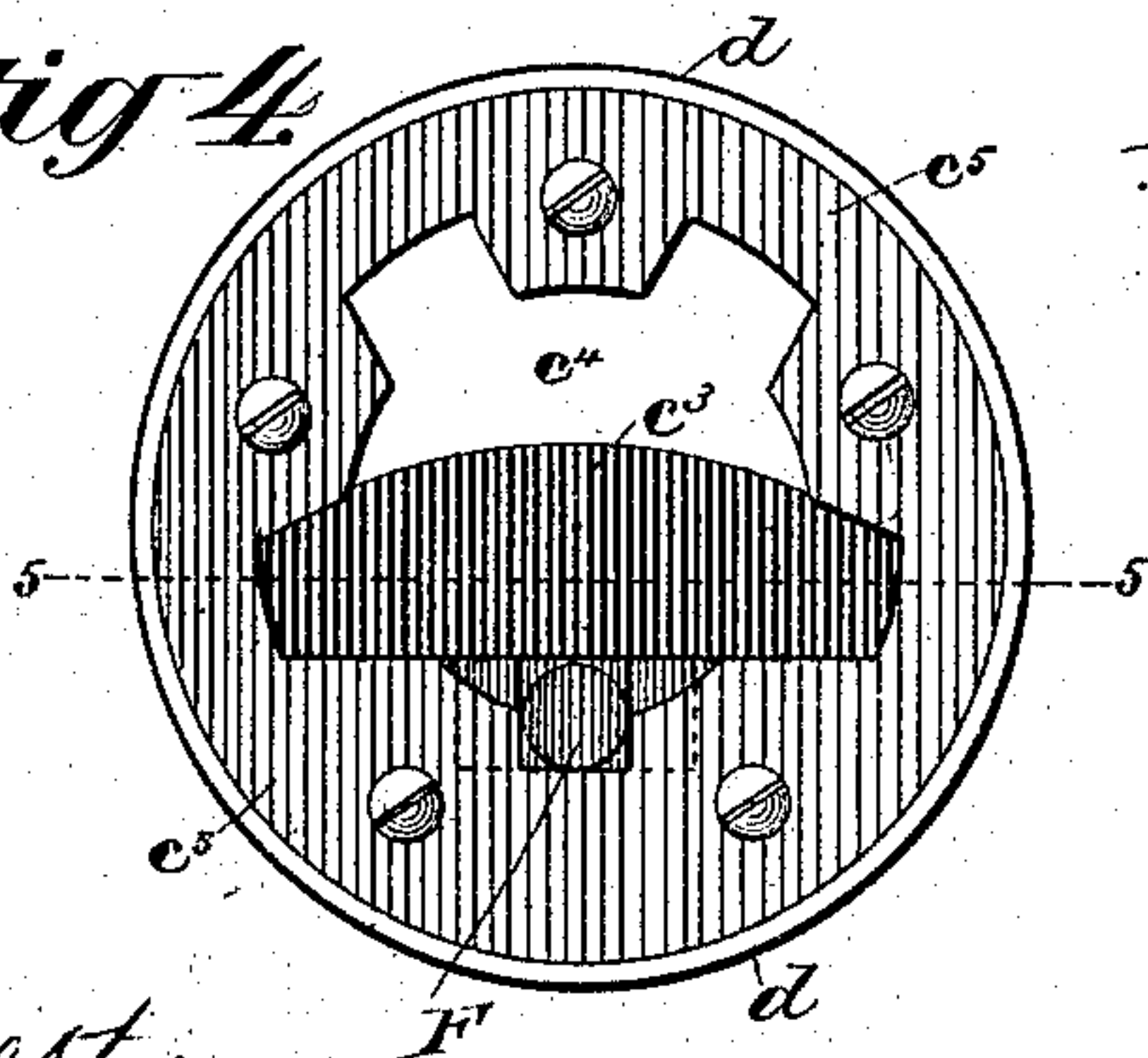
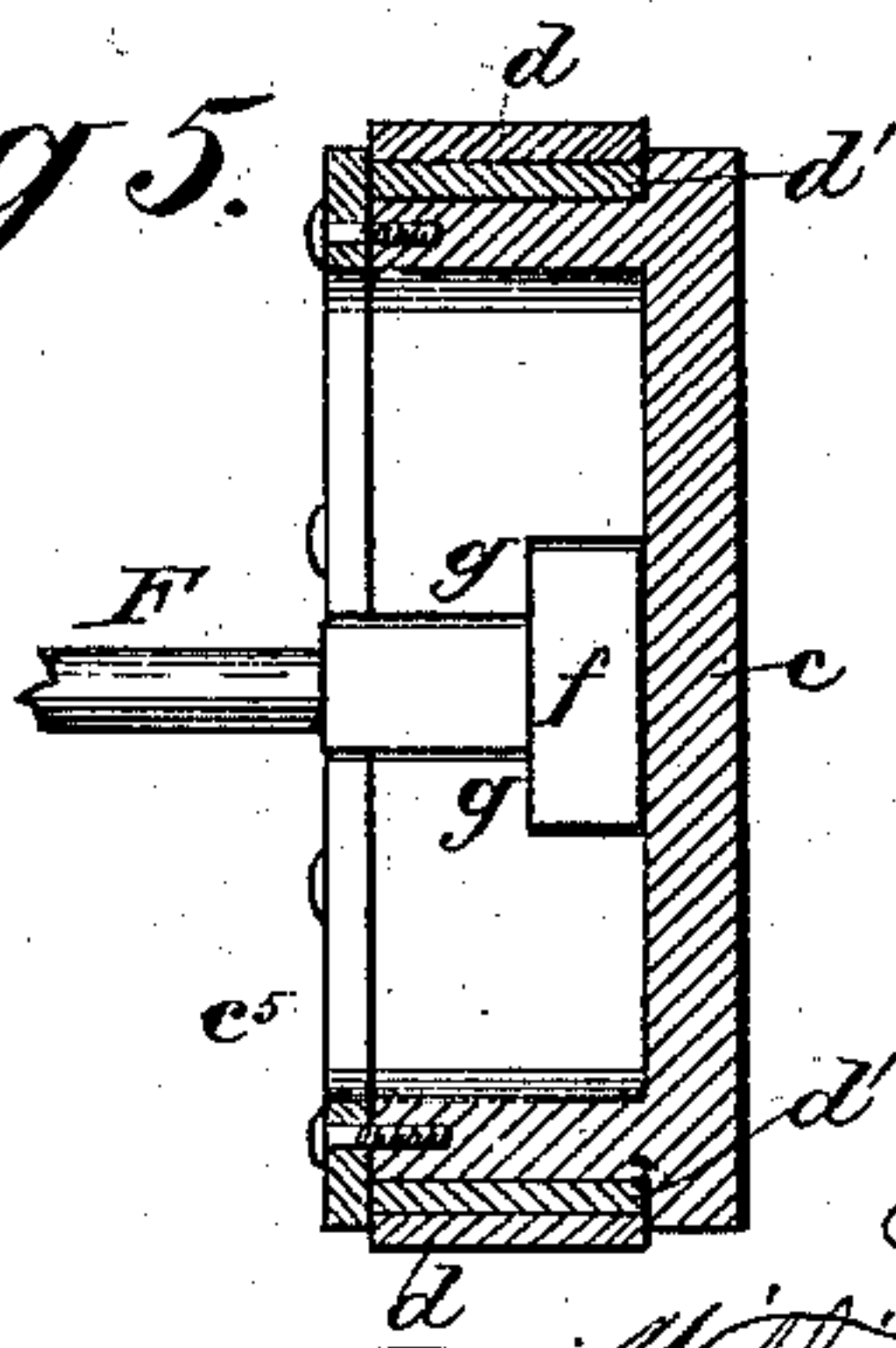


Fig 5.



Attest:

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UNITED STATES PATENT OFFICE.

WILLIAM FOLEY, OF KEOKUK, IOWA.

PISTON-VALVE.

SPECIFICATION forming part of Letters Patent No. 252,449, dated January 17, 1882.

Application filed October 15, 1880. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM FOLEY, a citizen of the United States, residing at Keokuk, in the county of Lee and State of Iowa, have
5 invented new and useful Improvements in Piston-Valves for Steam-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

10 My improvement consists, first, in combining with a round or cylindrical piston-head a steam-chest formed with openings at bottom extending up the sides, as hereinafter described.

My improvement consists, further, in a
15 valve-stem having a T-head adapted to fit in a suitable recess formed between lugs or shoulders, so as to permit the descent of the valve as it wears and at the same time prevent it turning in the steam-chest.

20 In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a vertical axial section of my improved device with the valve in side view, showing a form applicable to any ordinary locomotive-cylinder. Fig. 2 is a vertical axial section with valve in side view, showing the improvement applied to a throttle-valve. Fig.
30 3 is a vertical transverse section of one of the pistons, showing mode of applying packing-rings on the line 3 3, Figs. 1 and 2. Fig. 4 is an end view of the head on a larger scale, showing mode of connecting the stem. Fig.
35 5 is a horizontal section thereof, on a larger scale, on the line 5 5, Fig. 4.

A is part of a cylinder of a locomotive-engine.

40 B is the steam-chest, cylindrical upon its inside.

C is a head made to fit the inside of the steam-chest, and consisting of two pistons, c c' , with a connecting-neck, c^3 , and steam-passage c^4 , extending completely through the
45 head, to connect chambers b and b at each end. The head is preferably cast in one piece. Each piston has a circumferential channel to receive the packing upon it, the rings being held by the circumferential flanges c^5 , forming the side
50 walls of the channel.

The packing consists of two rings, d d' , for

each piston, each made with a single transverse or oblique cut, so that they are sprung into their channel in such relative position as to break joint, the rings being sprung inward
55 as the piston passes into the steam-chest, and tending to spring outward against the inside of the steam-chest, so that a steam-tight joint is made between them.

The packing-rings, working in conjunction
60 with the cylinder-ports a , are made at least as wide as said ports, so as to close them in a certain position of the valve. In practice I have made these rings of width sufficient to give the required lap, as shown in the drawings,
65 the rings being made, say, one-half inch (more or less) wider than the cylinder ports a .

The induction-ports of the steam-chest are shown at i , and the eduction-port of the steam-chest is shown at e , while the valve-ports of
70 the cylinder A, which; of course, act alternately as induction and eduction ports, are shown at a .

b^2 is the exhaust-chamber.

Within the piston c of the head C is a recess
75 to receive the T-head f of the valve-stem F. g g are lugs each side of the recess to engage the prongs of the T-head. The arrangement is such that a connection is made between the stem and the valve without any screw or key,
80 and the stem has capacity for vertical movement in the recess as the valve wears upon its seat. I is a stuffing-box, through which the valve-stem passes. When the valve is in the position shown in Fig. 1 the ports are closed;
85 then when the valve is moved away from the stuffing-box the steam-chamber of the head is brought in conjunction with the port a at that end of the cylinder.

It will be seen that the valve is perfectly
90 balanced as far as end-pressure is concerned, and is nearly balanced otherwise, because the pistons fit all around the inside of the steam-chest, so that there is no steam-pressure on the upper sides of the pistons, and the steam-
95 pressure upon the connecting-necks is equal on every side.

In applying my improvement to old locomotive-engines, or locomotive-engines where the common slide-valve has been in use, it is proper
100 to couple the stem to the valve below its center, as shown, to bring the valve-stem in line

with the end of the rocker-arm. The operation of this valve is the same as that of an ordinary D-valve; but its construction is different therefrom, as before described, it being perfectly balanced except at such times as the pistons of the valve overlap the edges of the steam-ports. In applying the improvement to an old engine the steam-chest B must be, of course, a separate casting from the cylinder A; but in the application of my improvement to a new engine the steam-cylinder A and steam-chest B may be cast in one piece.

In Fig. 2 my valve is shown as a throttle-valve, the construction of the valve itself being similar to that shown in Fig. 1. In this application the steam may enter through an induction-port, *i'*, at either or both ends of the steam-chest, the steam-pressure being equalized in both of the steam-chambers *b b* by the steam-passage *c'*, extending through the valve, as indicated by broken lines. When the valve is in the position shown the steam-port *a* and the exhaust-port *e* are in communication and shut off from the steam chambers *b b*. If the valve is drawn from this position toward the stuffing box, the steam-port *a* is thrown into communication with steam-chambers *b*, and the piston *c'* closes the exhaust-port *e*, so that steam flows through the port *a* into any steam cylinder or chest with which it may be in communication. When the valve is returned to the position shown the steam escapes through port *a* into the exhaust-chamber *b*² and through the induction-port *e*. The valve-stem F of the throttle-valve may be connected to any suitable operating-lever.

The flanges *c*⁵ need not be cast in one piece with their pistons, but may, one or more or all of them, be in separate pieces, and attached to their pistons by screws or otherwise.

I am aware that it is old to construct a cylindrical steam-chest with three ports at bottom and two inlet-ports at top, and do not, therefore, claim such construction, broadly.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of the round or cylindrical piston-head C, formed of two pistons, *c c'*, with a connecting-neck, *c*³, having steam-passage *c*⁴, extending through the neck and pistons, and the steam chest B, formed with induction-port and openings *a e* at bottom, extending up the sides of the steam-chest, as set forth.

2. The combination of the round or cylindrical piston-head C and the steam-chest B, formed with openings *i i a a e* at bottom, and extending up the sides of the steam-chest, as set forth.

3. The combination of the valve-stem F, having T-head *f*, and piston *c*, having lugs *g g*, the said stem and head adapted to fit in a suitable recess formed between lugs or shoulders *g g*, to permit the free descent of the piston-head as the valve wears and to prevent its turning in the steam chest.

WILLIAM FOLEY.

Witnesses:

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