

J. FISH.
Balanced Slide-Valves.

No. 224,525.

Patented Feb. 17, 1880.

Fig. 1.

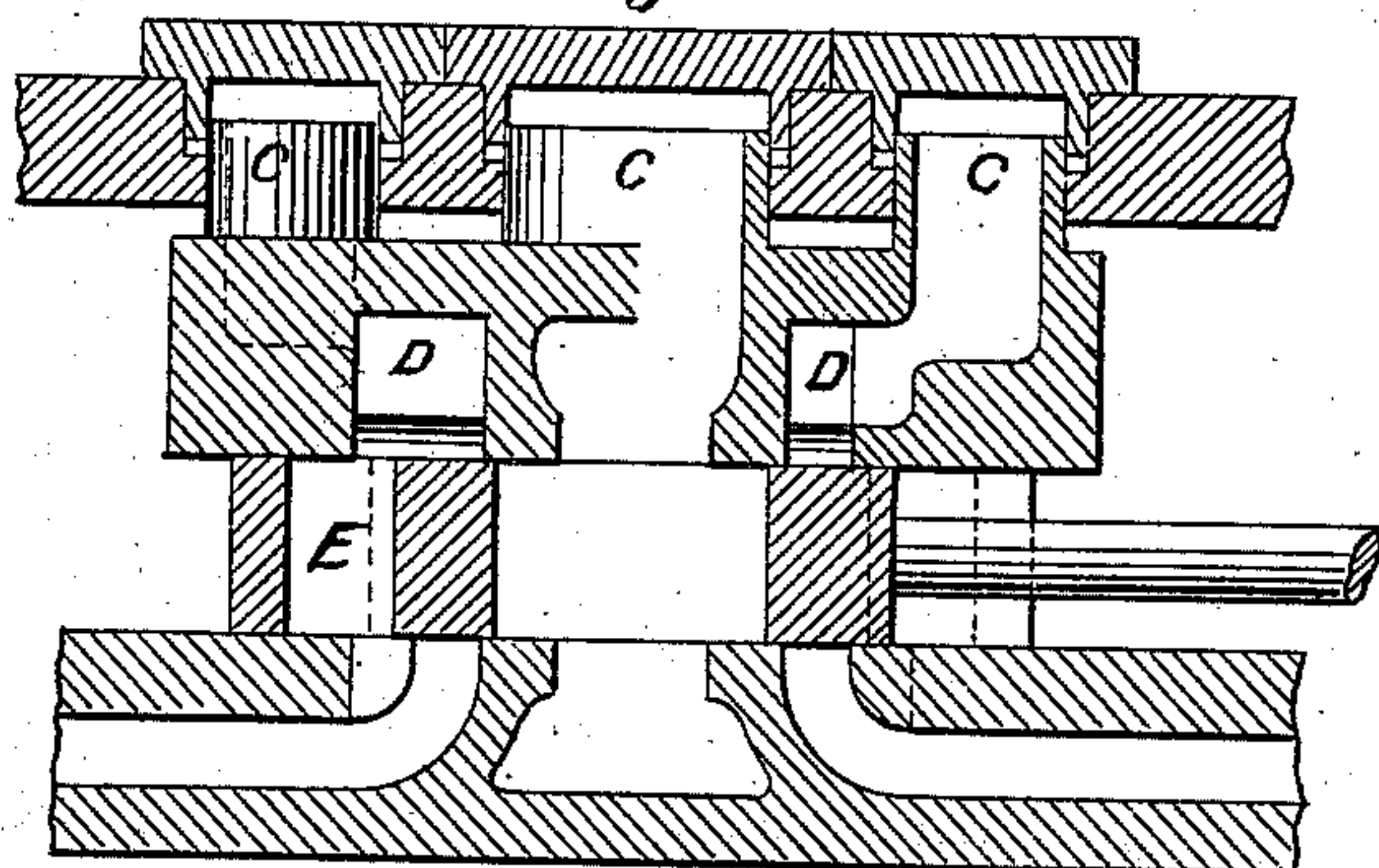


Fig. 2.

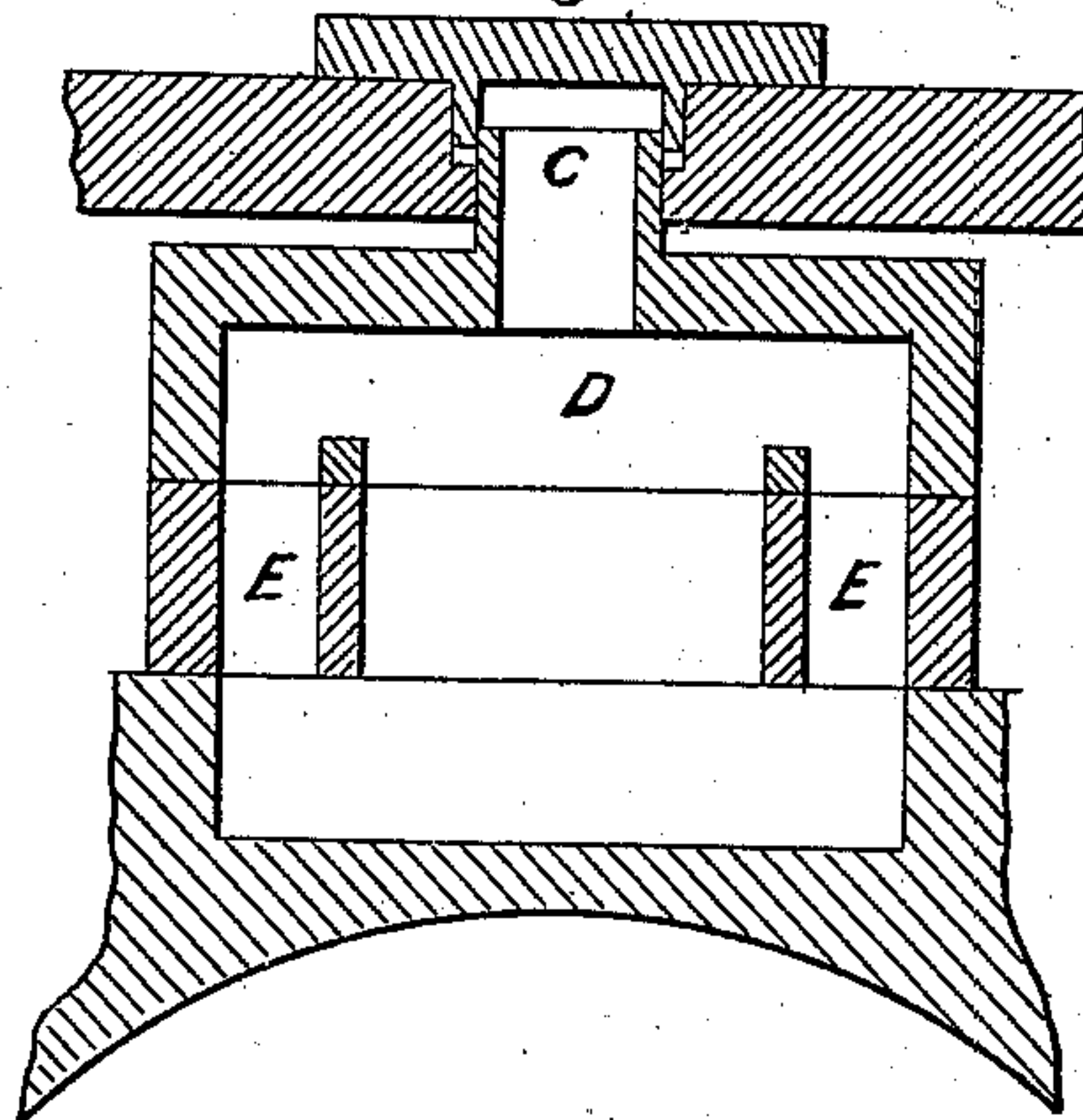


Fig. 3.

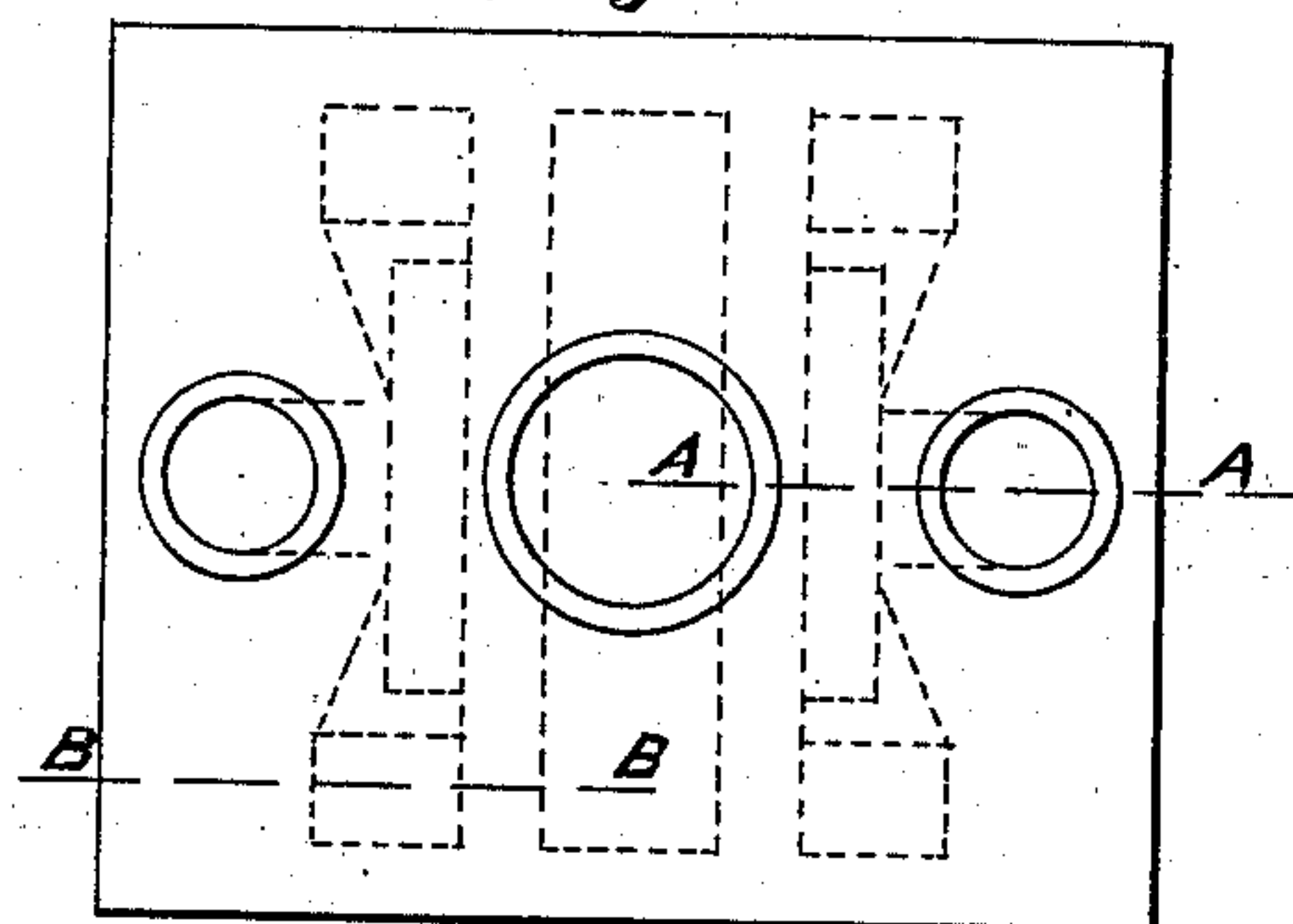


Fig. 4.

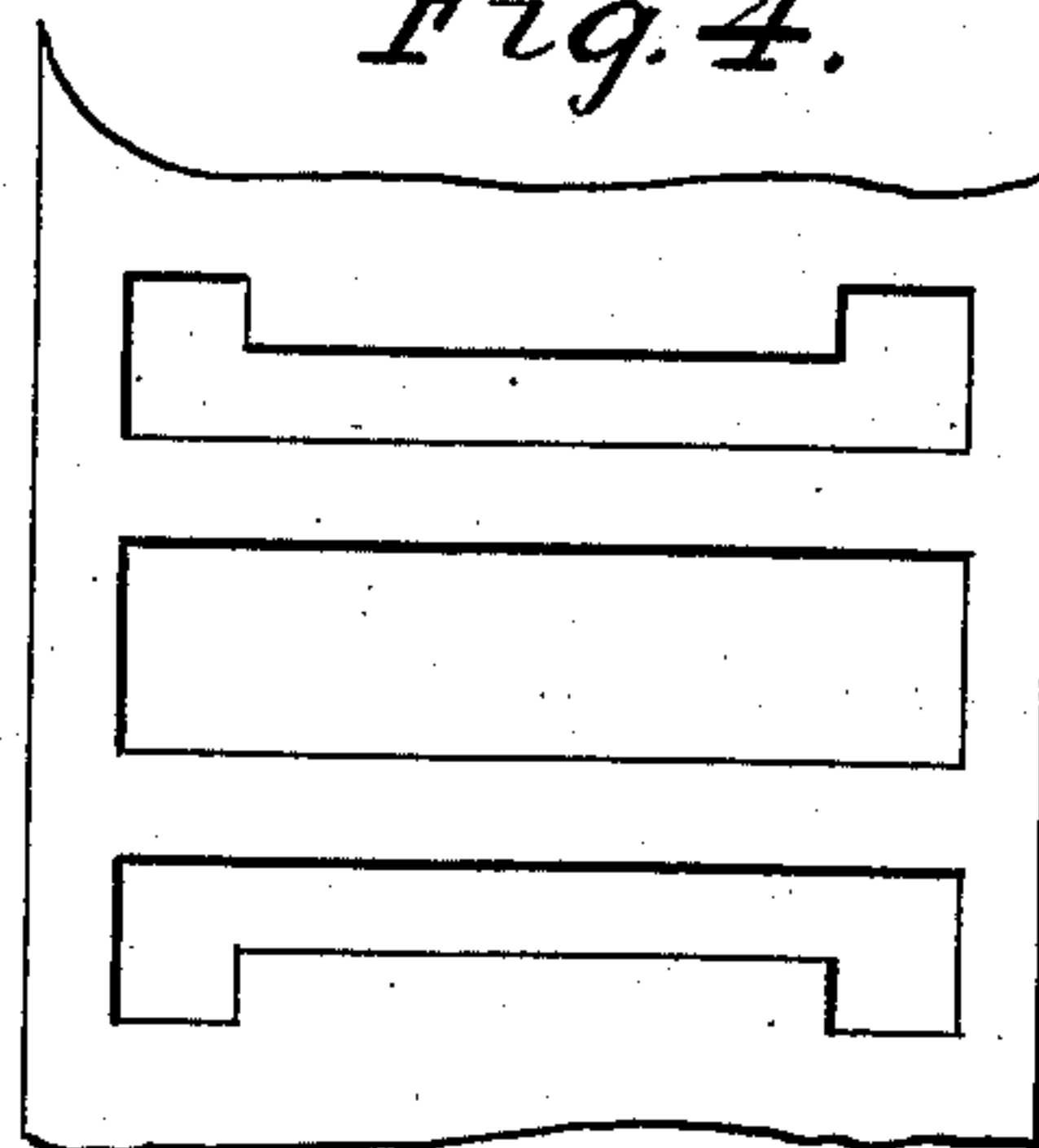
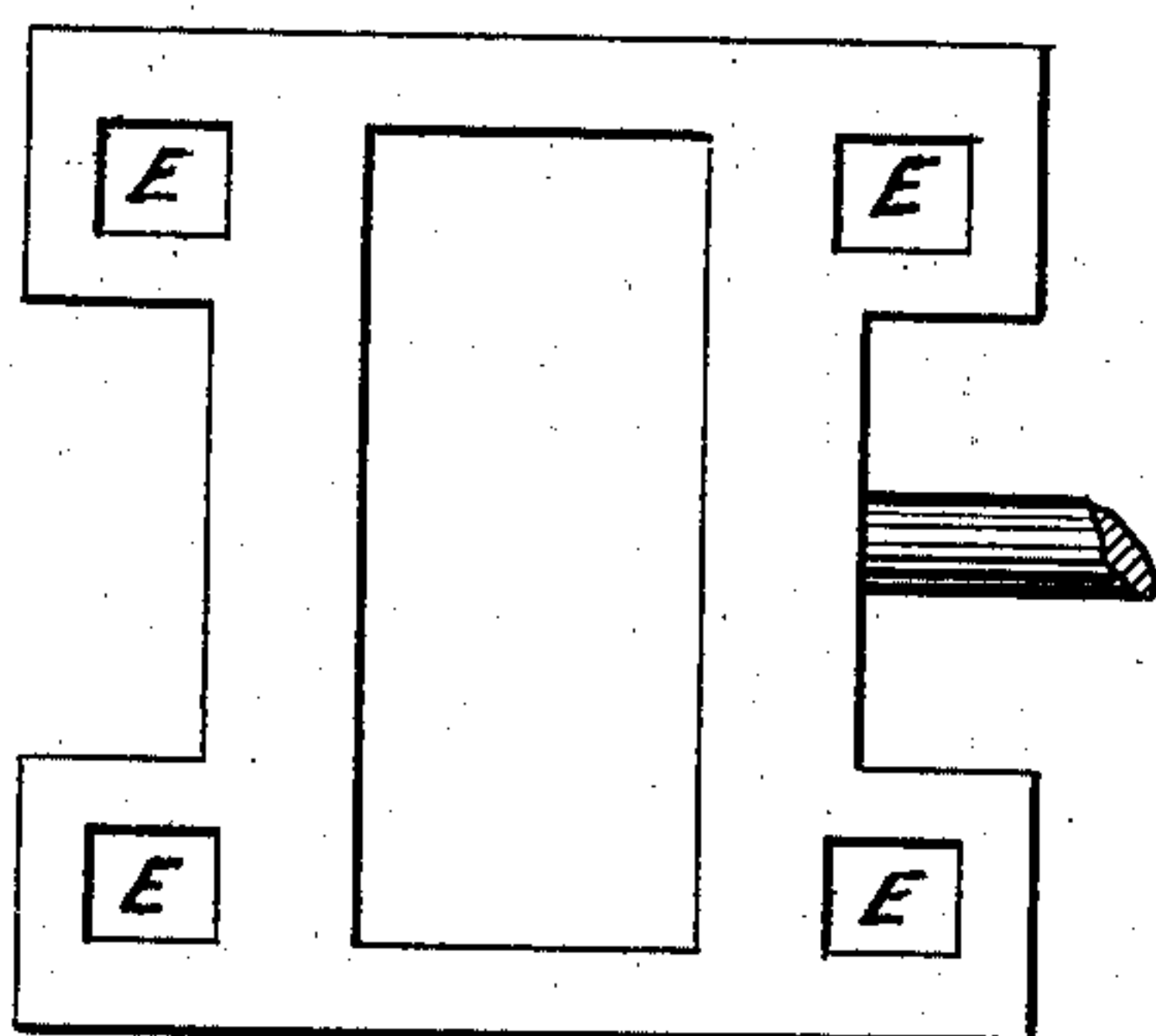


Fig. 5.



Witnesses;
William Littell
Fred. R. Littell

Inventor;
John Fish

UNITED STATES PATENT OFFICE.

JOHN FISH, OF SUMMIT, NEW JERSEY.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 224,525, dated February 17, 1880.

Application filed May 19, 1879.

To all whom it may concern:

Be it known that I, JOHN FISH, of Summit, in the county of Union and State of New Jersey, have invented certain Improvements in Balanced Slide-Valves, of which the following is a specification.

The object of my invention is to make balanced slide-valves for steam, air, or other engines, so that the pressure on the valve against the seat can be so adjusted as to operate as freely under full pressure as when the pressure is shut off entirely. At the same time the parts are so constructed as to effectually relieve the valve when the pressure in the cylinder becomes greater than the pressure in the steam or air chest.

The first part of my invention relates to the application of a self-adjusting abutment-plate for a slide-valve, having ports D arranged for the admission and egress of steam or air. These ports have each an area equal to half the area of the cylinder-passage, and connect with passages E passing through the slide-valve to the cylinder-passage. The orifice of the passage in the abutment-plate is so formed in relation to its connecting-passage through the slide-valve that in all positions of the slide-valve in its travel there is always an open communication from the cylinder-passage to the port in the abutment plate. I also attach pipes or connections C from each of the steam-ports in the abutment-plate, and also from the exhaust-port to a chamber in the steam-chest cover. These are each packed by suitable packing to prevent the leakage of steam from the steam-chest to the inside of the pipe. Each pipe or passage and its connection to the steam-chest cover is separate entirely from the other pipes. The aggregate outer area of these steam and exhaust pipes is so proportioned in relation to the area of the ports in the cylinder-face that any desired amount of pressure can be put on the back of the abutment-plate, so as to keep it tight on the slide-valve, and the same pressure keeps the slide-valve tight on the cylinder-face. It also allows the abutment-plate having the pressure of steam-chest on the back of it to follow up the wear of the valve. Thus the abutment-plate becomes the means of balancing the valve, and also itself, to any desired

amount, and at the same time automatically follows up the wear of the valve and keeps it tight without any attention or outside adjustment. Whatever pressure there may be between the slide-valve and the piston at either end of the stroke, these pressures have no influence on the valve, but each is transmitted through its own passage in the abutment-plate to the steam-chest cover. When the pressure by water or compression of steam in the passages exceeds the pressure in the steam-chest the abutment-plate rises and relieves itself.

The second part of my invention relates to the slide-valve, which is formed in such a manner that the face next to the cylinder-face opens a port the area of which equals half the area of the cylinder-passage directly into the cylinder-passage. The opposite face of the valve opens a port in the abutment-plate, also half the area of the cylinder-passage, connecting to suitable passages in the slide-valve that are always open to the cylinder-passage. By this arrangement, whatever pressure there may in the cylinder or its passages to the valve, the same pressure is maintained on the opposite faces of the valve, and keeps it in perfect balance in all positions of its travel.

In regard to the operation of exhausting the steam, the construction of the valve is such that when the exhaust-edge of the valve has opened the induction-port one-half its width the free opening of exhaust through the valve on both edges, top and bottom, equals the full area of cylinder-passage, or twice the area of the common slide-valve under the same conditions.

The accompanying drawings form a part of my specification, and represent the best means of carrying out my improvement in balanced slide-valves.

Figure 1 is a transverse section on the right through line A A on plan, Fig. 3, and section B B, taken through line B B on plan, Fig. 3. Fig. 2 is a cross-section of cylinder-face, slide-valve, abutment-plate, and chest-cover. Fig. 3 is a plan of abutment-plate. Fig. 4 is a plan of cylinder-face ports. Fig. 5 is a plan of slide-valve.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A self-adjusting abutment-plate for a balanced slide-valve, having steam ports and passages opening into passages in the slide-valve in one direction and into separated chambers in the steam-chest cover in the other direction, 5 the passages to steam-chest cover, the passages in abutment-plate and through the slide-valve being in open communication with the cylinder-passage in all positions of the slide-valve in its stroke, all constructed and arranged substantially as shown. 10

2. The balanced slide-valve, arranged so as to admit steam to the cylinder-passage on one face, in combination with the passages marked 15 E E E E, passing through the valve, which allows the steam to pass to the cylinder-pas-

sages that is admitted by the valve on the opposite face through the port of the abutment-plate, constructed and arranged substantially as specified, and as herein set forth. 20

3. The self-adjusting abutment-plate P, having ports and passages connecting chambers in the steam-chest covers to passages in the slide-valve, in combination with the slide-valve S, having passages E E E E, connecting to 25 passages C C C in abutment-plate to cylinder-passages, substantially as described, and for the purpose herein set forth.

JOHN FISH.

Witnesses:

WM. LITTELL,

FRED. R. LITTELL.