

(No Model.)

J. M. BUCKLEY.

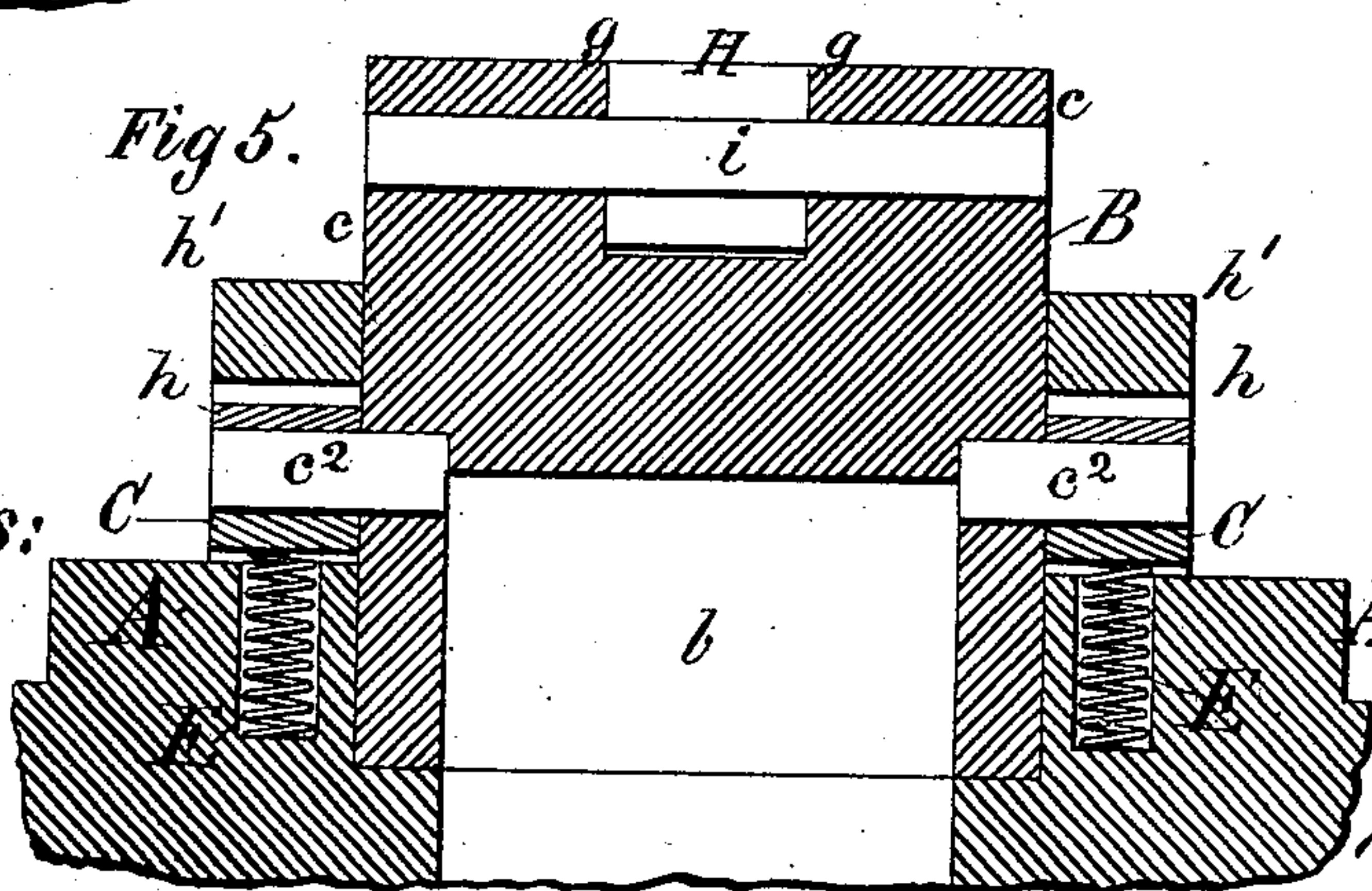
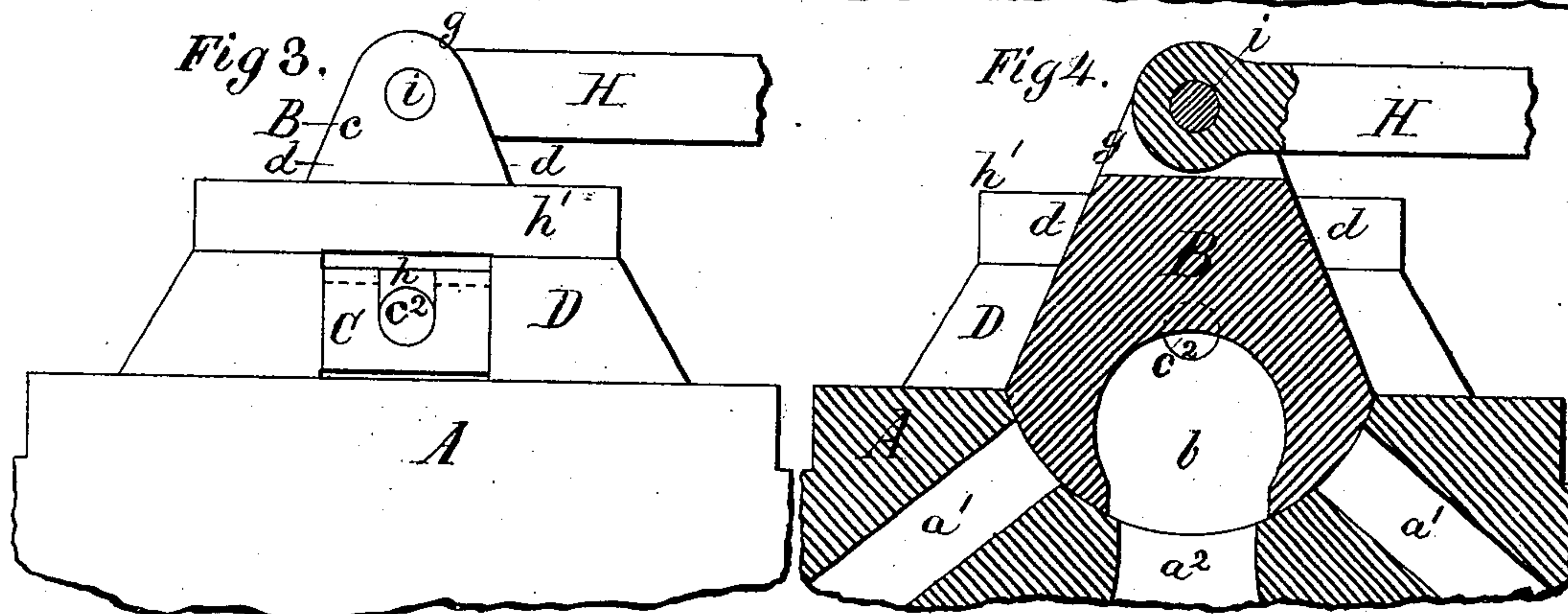
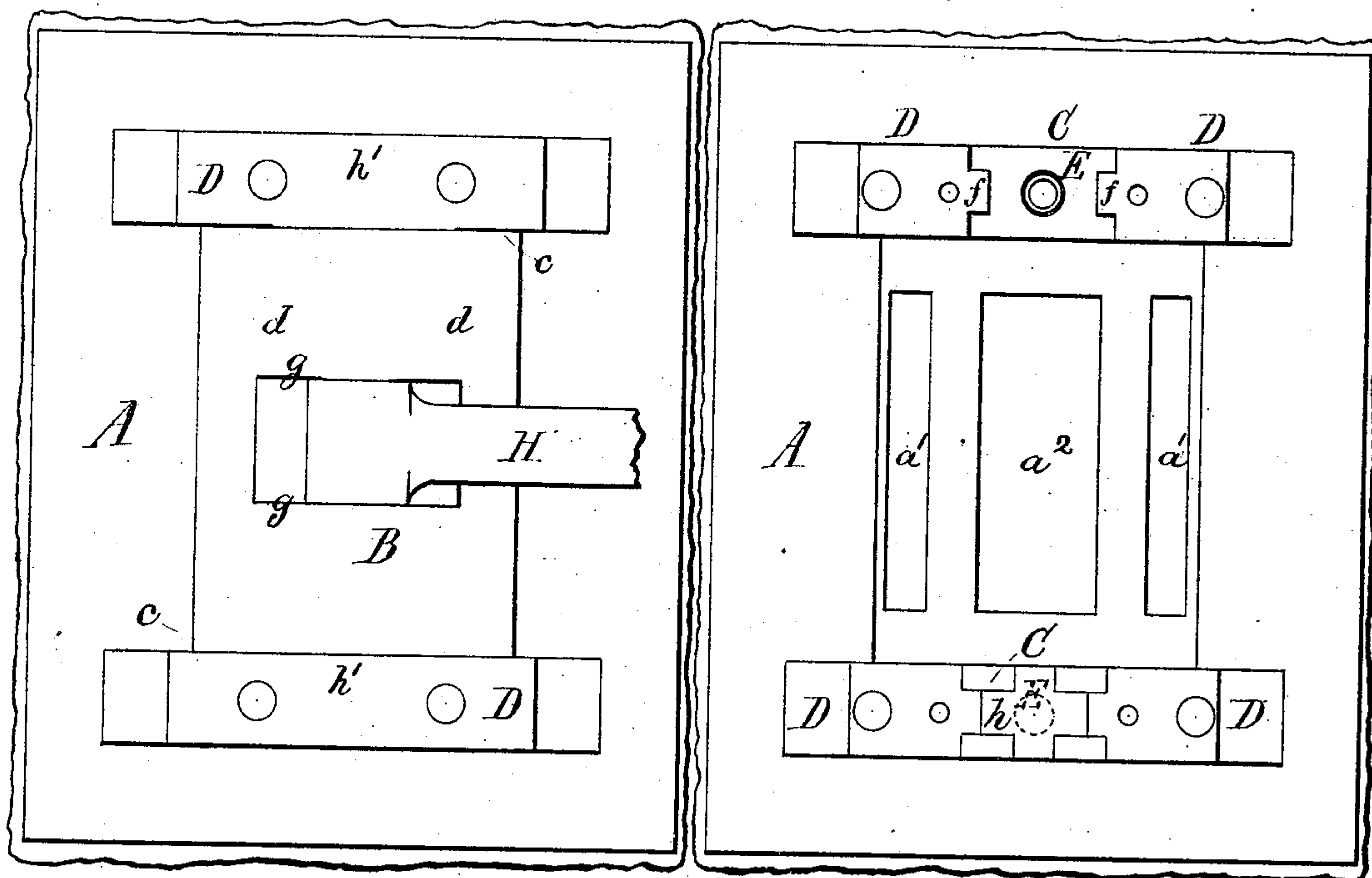
OSCILLATING STEAM VALVE.

No. 284,719.

Patented Sept. 11, 1883.

Fig 1.

Fig 2.



Witnesses:

Robt L. Fenwick.

R. L. Fenwick

Inventor:

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by his atty

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UNITED STATES PATENT OFFICE.

JOHN M. BUCKLEY, OF SEDALIA, MISSOURI.

OSCILLATING STEAM-VALVE.

SPECIFICATION forming part of Letters Patent No. 284,719, dated September 11, 1883.

Application filed July 2, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. BUCKLEY, a citizen of the United States, residing at Sedalia, in the county of Pettis and State of Missouri, have invented a new and Improved Oscillating Steam-Valve, of which the following is a specification.

My invention consists in the combination, with a valve-seat which is concave, of an oscillating valve supported in vertically-sliding spring trunnion-bearings, and having a segmental working-face made hollow and provided with a central exhaust-chamber, and with front and rear sides, which are formed on planes and are inclined from the top of the valve in reverse directions to its segmental face, whereby the pressure of the steam in the chest is caused to act on the front and rear of the valve as well as on its upper edge, and a too great pressure and friction of the valve upon its seat is prevented. The front, rear, and top pressure upon the valve, while tending to keep the valve down to its seat, cannot act with too great a downward force, inasmuch as the spring trunnion-bearings serve to counteract and relieve this pressure in a very perfect manner.

My invention also consists in an oscillating valve having a central exhaust-chamber provided with side cheeks, side guides for said cheeks, and vertically-sliding trunnion-bearings mounted upon springs, in combination with a concave valve-seat, whereby the valve is allowed to move up and down, and also oscillate without endwise movement, and is relieved of undue pressure of steam and prevented from working with too much friction upon the valve-seat when steam is on, and is thrown up entirely out of contact with the seat when steam is off, and thus saved from unnecessary wear. With my valve, which is inclosed in a steam-chest, the steam is admitted into the inlet-passages of the cylinder at the respective ends of the valve during the swinging or oscillating movement of the valve on its trunnions, while the exhaust takes place at the center of the valve, the same as with the ordinary slide-valve. During the oscillations of the valve, when steam is either off or on, the spring-bearings of the trunnions will always exert a sufficient lifting force upon the valve to nearly

balance it and keep it from a grinding contact with its seat; and when the engine is going downgrade and is not working steam, by using the link-motion which is commonly employed and hooking the engine on its center the travel of the oscillating arm and valve can be arrested.

In the accompanying drawings, Figure 1 is a top view of my improved oscillating valve on its seat, the steam-chest being removed. Fig. 2 is a top view of the valve-seat and the sliding spring-supported trunnion-bearings, the cap-plates for confining said bearings and the valve in place being removed. Fig. 3 is an end view of the parts shown in Fig. 1. Fig. 4 is a vertical longitudinal section of the valve-seat and valve as they appear when steam is shut off from both ends of the cylinder, and Fig. 5 is a vertical transverse section of the valve-seat and valve as shown in Figs. 3 and 4.

A in the drawings is the valve-seat, made with a segmental concave surface, *a*, in which three ports, *a'* *a'* and *a''*, are provided, as in ordinary horizontal seats of slide-valves. The ports *a'* *a'* receive steam for the cylinder, and the port *a''* exhausts it from the cylinder at either end, as usual.

B is the valve, having its working-face of an area sufficient to cover all the ports and of a segmental and convex form, and in this face is formed a chamber, *b*, which makes the valve hollow and serves as an exhaust-steam chamber, as shown. The ends or cheeks *c c* of this valve are vertical, and its front and rear surfaces, *d d*, are reversely inclined, so as to give the valve in section a form similar to the outline of the letter A above its segmental convex portion, as shown in Fig. 4. About midway of the height of the valve-cheeks *c c* short trunnions of steel, *e' e'*, are provided, and these trunnions are hung in bearings C C, which are fitted by tongues and grooves, as at *f f*, to side guides, D D, on the valve-seat. The bearings C C are mounted upon strong spiral springs E E, which are properly housed in the guides, and by means of these springs they and the valve are held up above the valve-seat, and when pressure of steam comes upon the inclined front, rear, and the upper edge of the valve these springs nearly or about balance the pressure of steam and serve to prevent the

valve being pressed down upon its seat with a grinding-pressure, or such a pressure as would cause it to work with great friction and wear. On the upper end of the valve lugs *g* are formed, and to these the connecting-rod *H* is attached by a pin, *i*, as shown. The valve and its bearings are confined in position by cross-shaped followers *h* and cap-plates *h' h'*, screwed upon the side guides, as shown. The valve in its movements is sustained by the guides against endwise movement, and it is truly guided up and down by the tongues on the bearings of the trunnions, which tongues move in the grooves of the side guides.

My valve can be arranged to have its travel direct by changing the eccentric; and the springs may be powerful enough to raise the valve an inch or more from its seat when not working steam, and thus not have the valve touch its seat or be subjected to wear when no work with steam is being performed, as when moving downgrade or under other circumstances. With my arrangement of valve a large per cent. of the pressure can be taken off when working steam and the wear and tear of machinery greatly reduced.

I am aware of Letters Patent No. 163,497, wherein is shown an oscillating valve having a chamber into which live steam is admitted by passages, and such steam is employed for holding up the valve by its pressure; and as this valve operates on a different principle from mine, I make no claim for the same. My valve is held up entirely by springs, and it is essen-

tial with my construction and arrangement that the live steam shall press down upon the valve and keep it to its seat steam-tight, while the springs hold it up sufficiently to prevent undue friction and grinding away on its working-face during its oscillations.

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

1. The combination, with the valve-seat having a segmental concave surface, with induction and an exhaust port, the former ports being arranged for direct communication with the steam-chest, of a valve hung on trunnions held up by springs and pressed down by live steam, said valve having a solid convex surface for closing the induction-ports, and being provided with a chamber which serves as an exhaust-steam chamber, and also having its sides inclined in reverse directions and its ends fitted in guides on the valve-seat, substantially as and for the purpose described.

2. The combination of the concave valve-seat, the valve made solid on its convex surface, where it moves over the induction-ports, and hollow between these solid portions, and provided with vertical ends or cheeks, short trunnions, vertically-sliding trunnion-bearings, springs, and guides having grooves and followers, all substantially in the manner and for the purpose described.

JOHN M. BUCKLEY.

Witnesses:

JNO. DE LONG,
THOMAS DRIVER.