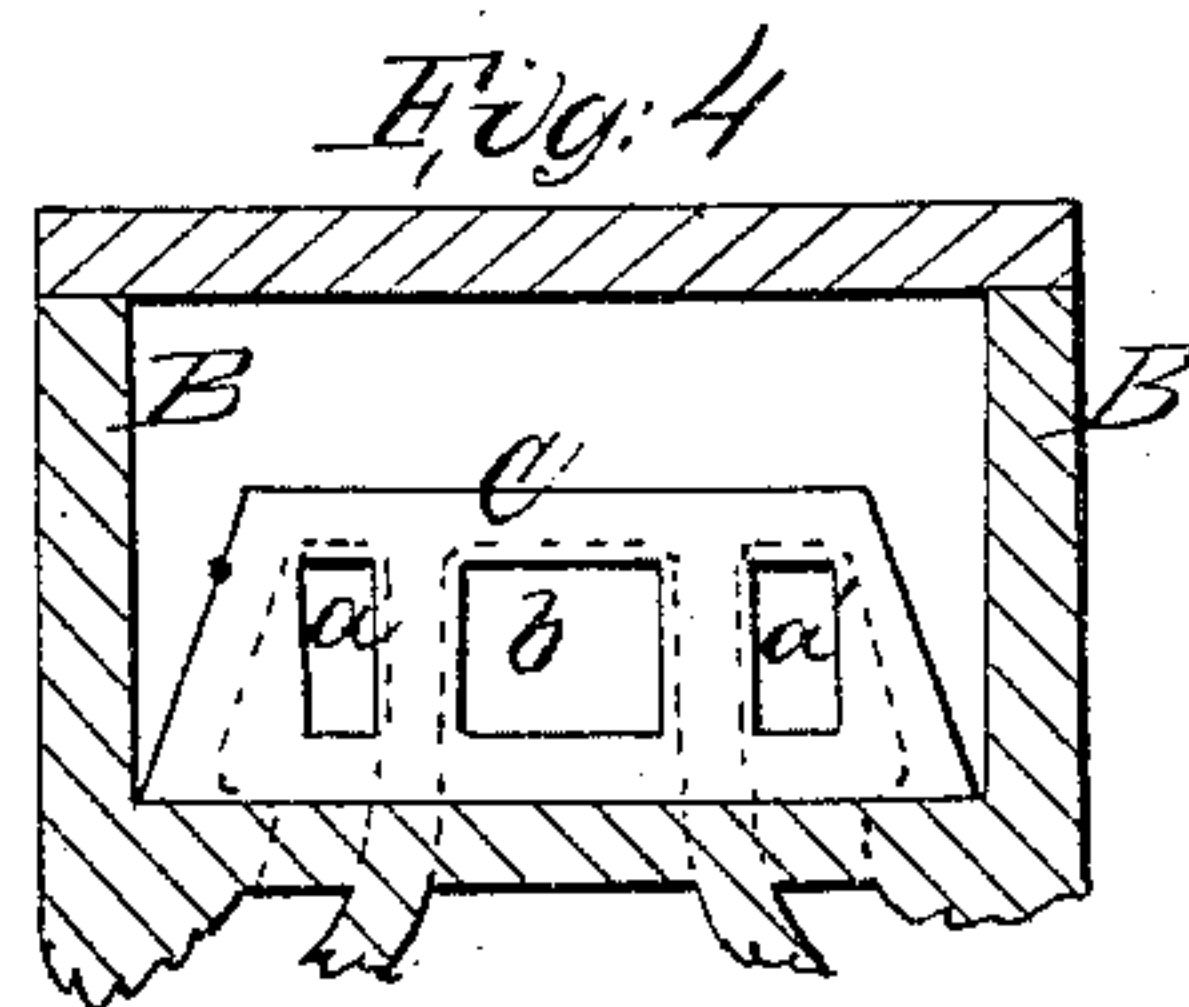
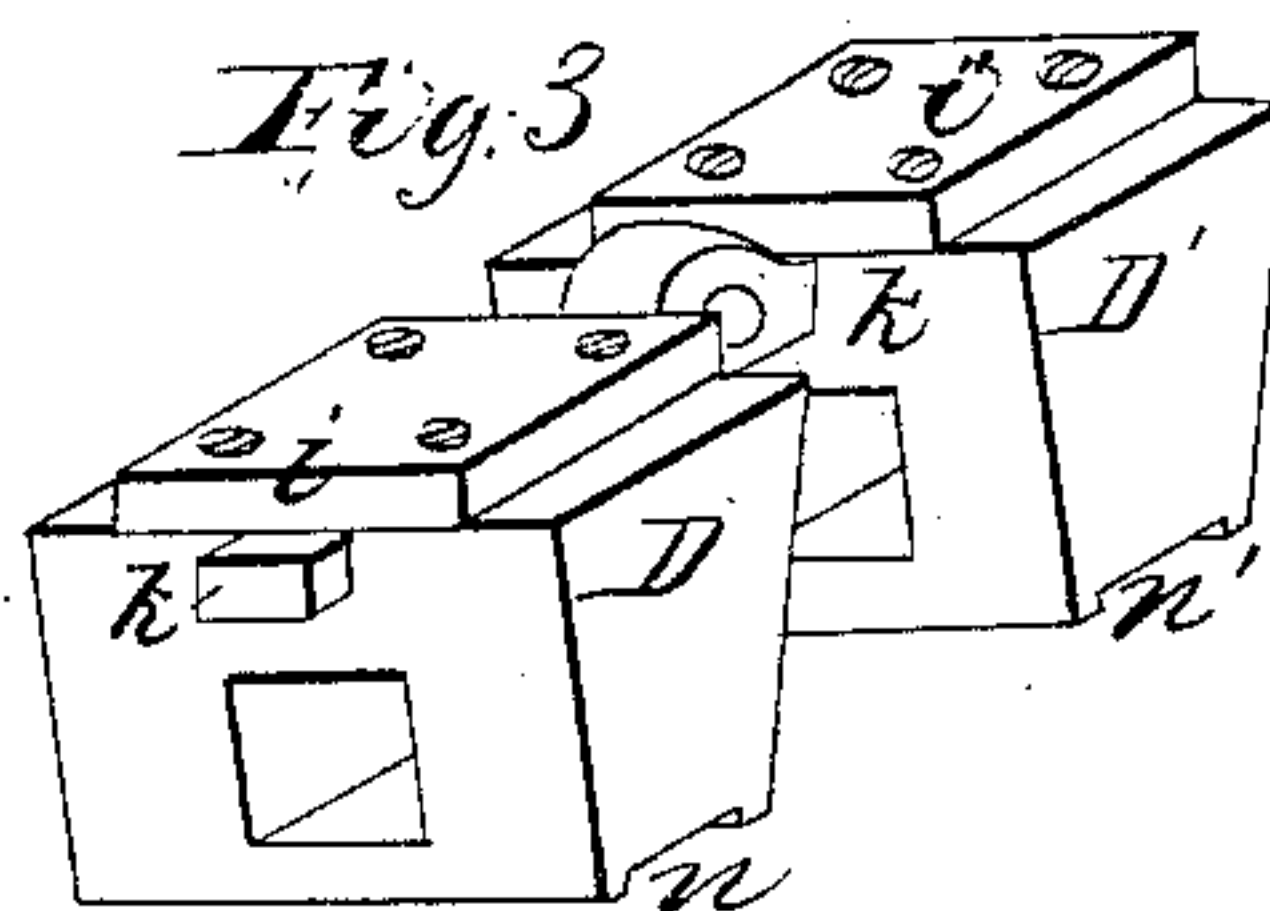
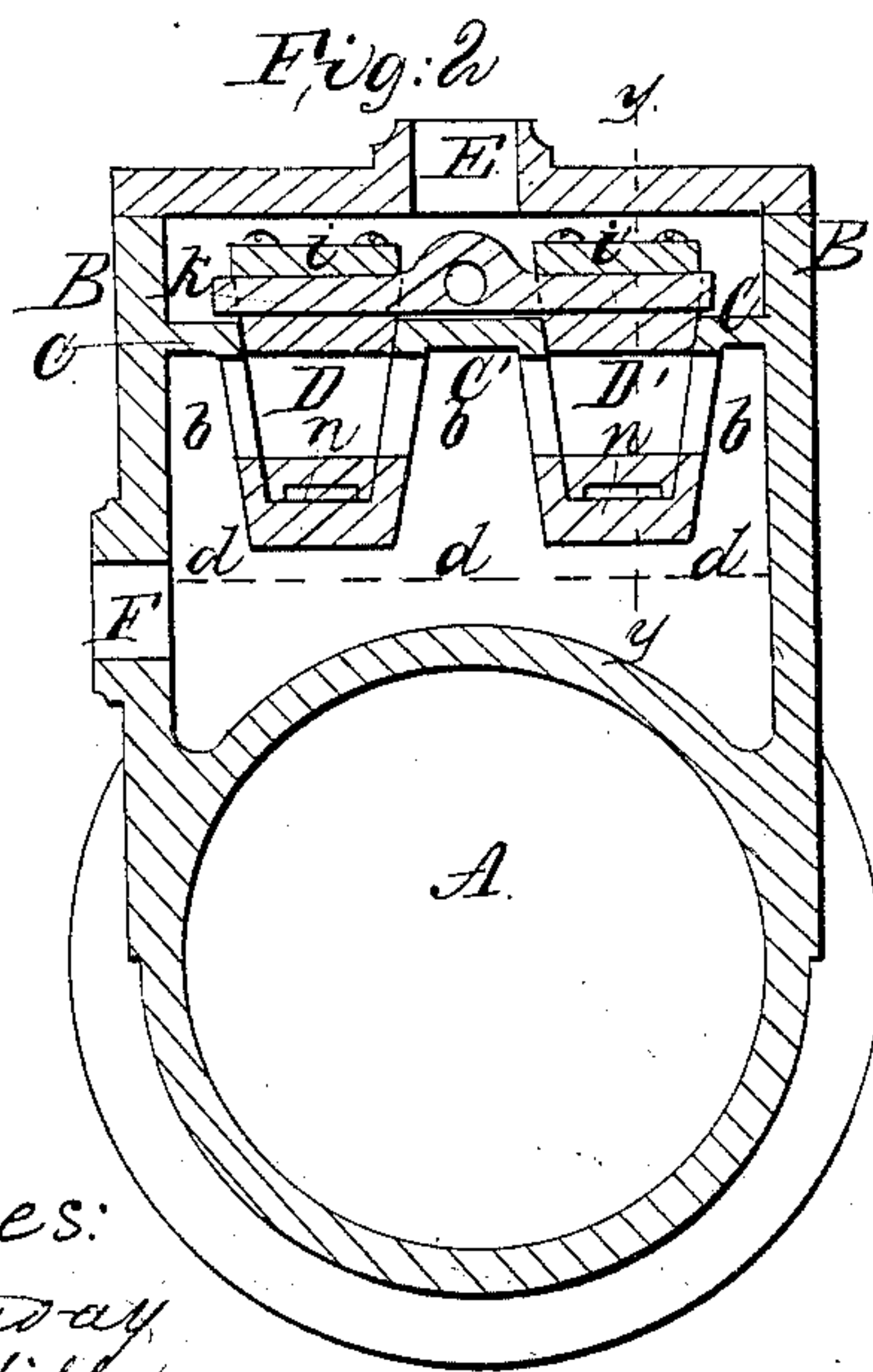
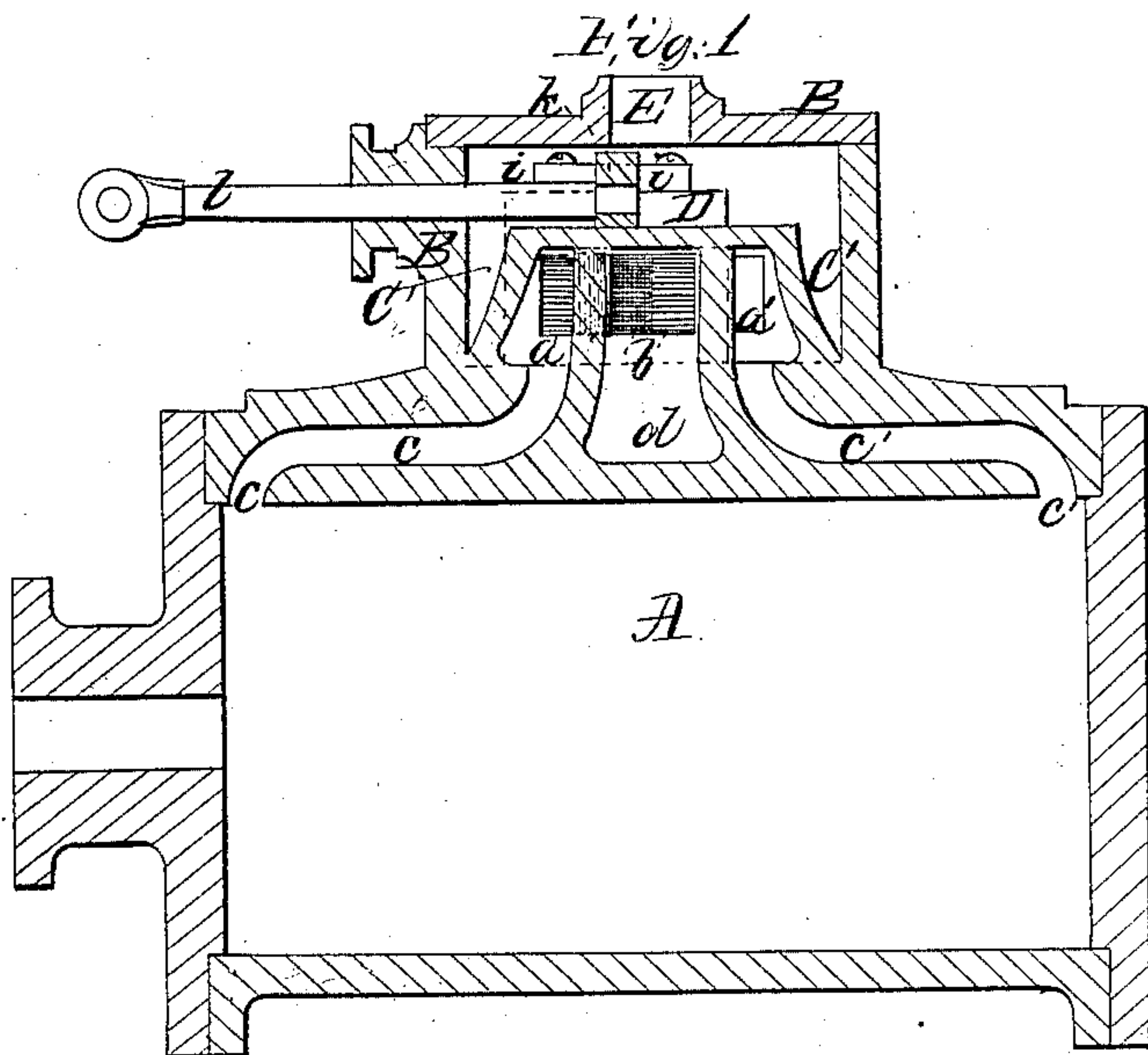


J. A. Woodbury,
Steam Balanced Valve.
N^o 63,352. Patented Mar. 26, 1867.



Witnesses:
Geo. C. Hathaway
Chas. Mansfield

Inventor:
James A. Woodbury

United States Patent Office.

JAMES A. WOODBURY, OF BOSTON, MASSACHUSETTS.

Letters Patent No 63,352, dated March 26, 1867.

IMPROVEMENT IN VALVES FOR STEAM ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

Be it known that I, JAMES A. WOODBURY, of Boston, in the county of Suffolk, and State of Massachusetts, have invented a new and useful Improvement in Balanced Slide-Valves for Steam Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a longitudinal vertical section of a cylinder and steam chest containing my improvement.

Figure 2 is a transverse vertical section of the same.

Figure 3 is a view of the valves and connecting cross-head; and

Figure 4 is a longitudinal vertical section on the line *g g* of fig. 2

Similar letters represent like parts in the several figures.

This invention is designed more particularly as an improvement in slide-valves, for which a patent was granted to me on July 4, 1865, and it consists in so constructing two or more valves and combining them with wall ports, as that they may form four or more openings without any outside pressure of steam upon the valves, the parts of the valves being filled independently of each other, and so arranged as to admit of the free contraction and expansion of the walls and valves.

Referring to the drawings, A represents the cylinder, and B the steam chest. Within the steam chest are arranged the side walls, one, *c'*, at the centre, and one, *c c*, at each end, containing respectively the inlet ports *a a'*, and exhaust ports *b b'*. The inlet ports communicate with the steam cylinder through the steam passages *c c'*, and the passage *d* connects with the exhaust in the usual manner. The steam valves D D' are arranged on either side of the central wall *c'*, and are formed with their sides inclining inwardly from top to bottom, as shown in figs. 2 and 3. Extending across the top of each valve, and fitting loosely in a slot or groove in the same, is a cross-head, *k*, which is secured in place by means of caps, *i i*, so as to admit of expansion or contraction of the valves between the walls. A valve-rod, *l*, is attached to the cross-head *k* in any suitable manner. On the under side of each of the valves D D', is a groove or recess, *n n'*, for the purpose of admitting steam to that portion of the valves, and thus cause the same to serve as a balance valve; the steam acting with nearly uniform pressure upon all sides of the valves. The valves are ground or scraped upon their sides or bearings, so that they will not be liable to become loose or leaky. Steam is introduced from the boiler into the passage E, and the exhaust steam passes off at F. I have shown and described but two valves and three openings, but the number of each may be increased with the increased size of the cylinder, either by arranging them side by side, with one wall between every two valves, or by placing different sets at either end of the cylinder. My invention is equally applicable to horizontal, upright, or inclined cylinders.

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

The combination of two or more valves with intermediate walls when constructed and operating substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES A. WOODBURY.

Witnesses:

J. H. ADAMS,

WILLIAM E. LOCKWOOD.