

A. HARTUPEE.
Steam Engine.

No. 93,199.

Patented Aug. 3, 1869.

Fig. 1

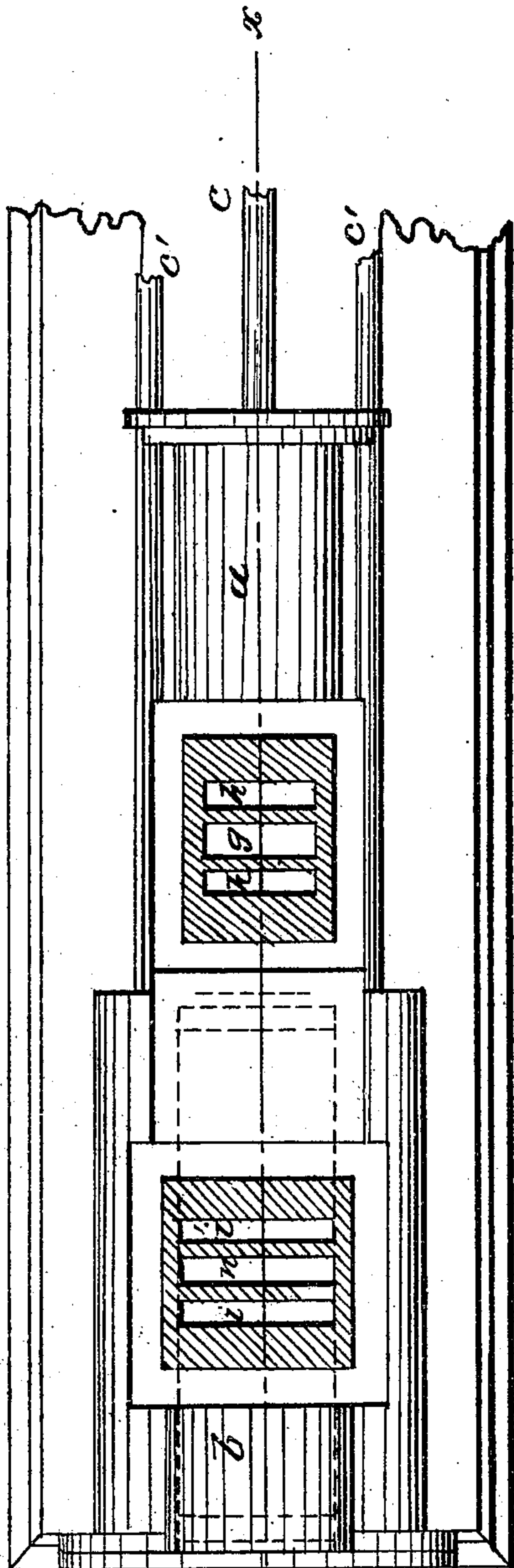
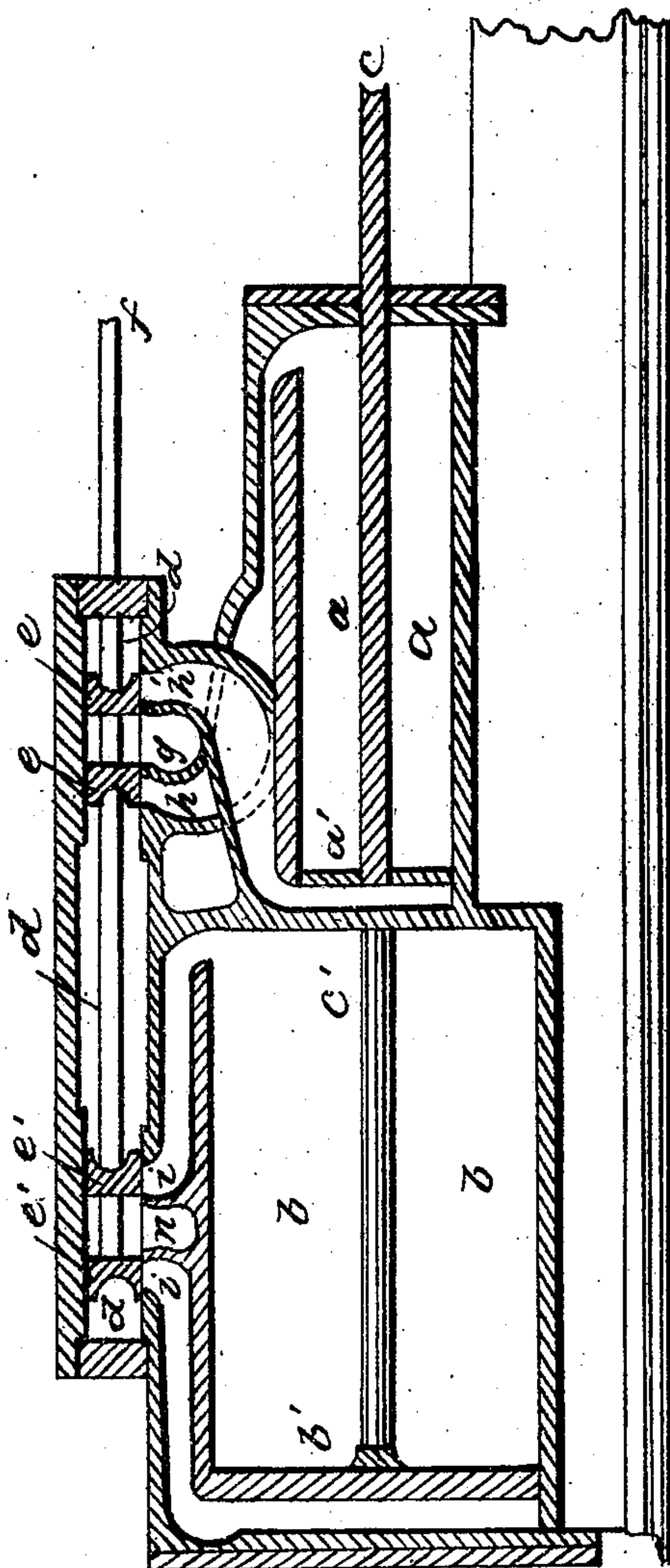


Fig. 2



Witnesses
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United States Patent Office.

ANDREW HARTUPEE, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 93,199, dated August 3, 1869.

IMPROVED STEAM-ENGINE.

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

To all whom it may concern:

Be it known that I, ANDREW HARTUPEE, of the city of Pittsburg, in the county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which—

Figure 1 is a top or plan view, showing a double cylinder, and the bottom of the steam-chest, and

Figure 2 is a longitudinal vertical section thereof, and also of the valves and steam-chest complete.

Like letters of reference indicate like parts in each.

My invention relates to that class of steam-engines in which the steam is used expansively, first in one cylinder, whence, after each stroke of the piston, and before the steam has expanded to anything like its full capacity, it is exhausted, through a steam-chest, into another and larger cylinder, where it acts on a larger piston.

In order to prevent loss by condensation, and to secure a simultaneous stroke in the same direction to both pistons, I have arranged the two cylinders together, end to end, under a single steam-chest, operate both valves therein by a single valve-stem, exhaust from the first or smaller cylinder into the steam-chest, and thence pass the steam through suitable ports into the larger cylinder.

Then, in order that both pistons may be operated simultaneously, and in the same direction, I have devised, in connection with such double cylinders, double valves and valve-chest, cross-ports, as hereinafter described, by means of which I am enabled to accomplish the results stated with the greatest utilization of power and minimum of loss, and therein consists the nature of my invention.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and mode of operation.

a and *b* represent two steam-cylinders, of the ordinary or any known construction, the first one, *a*, being much less in diameter than the second one, *b*, the ratio being, preferably, as 1 to 5. Both have the same length of stroke.

In these cylinders the pistons *a'* and *b'* operate, in the usual way, and communicate motion through the stems *c* *c'* connected therewith.

d is a steam-chest, covering the ports and valves of both cylinders.

e and *e'* are slide-valves, of the usual or other known construction.

A single stem, *f*, operates both valves.

Through the port *g*, steam is admitted from the steam-generator or boiler.

The ports *h* *h'* lead from either side of this port *g* to the opposite ends of the cylinder *a*, but in doing so they cross each other, as shown in fig. 2.

Then, with the throw of the valve *e* in either direction, both of the ports *h* *h'* are opened, by which steam passes from the port *g* to the cylinder *a*, and by the other of which the steam is exhausted from the cylinder *a* into the steam-chest *d*, and so on continuously and alternately.

The other valve, *e'*, operates in the usual way, alternately uncovering the steam-ports *i* *i'*, to receive and pass into the cylinder *b* the steam in the steam-chest *d*, (it having been previously used in the cylinder *a*), and also alternately bring each port *i* *i'* into communication with the exhaust-port *n*.

The valve *e* is a little narrower than the steam-chest, so that steam exhausted from the port *h'* may pass around it, to enter the other cylinder.

It will now be perceived that the two pistons, *a'* *b'*, operate together in the same direction, and with the same length of stroke; that the valves *e* *e'* likewise have a common direction and length of throw; that the first cylinder *a* takes steam through its opposite ports, from a common steam-port, *g*, uses the steam expansively up to a certain point of its expanding-power; that the steam is then exhausted into the steam-chest *d*, and passed into the other and larger cylinder *b*, where it continues to act expansively on the piston *b'*.

To attain these results, I make the ports *h* *h'* cross each other, each one leading to the opposite end of the cylinder *a*. Thus, that is, by cross-ports, and while having but a single steam-port, *g*, and a single exhaust-port, *n*, I attain the desired results.

The devices described are free from complexity, cheaply constructed, and durable.

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

In a double-cylinder steam-engine, the cross-ports *h* *h'*, in combination with the valves *e* *e'* and steam-chest *d*, constructed substantially as hereinbefore set forth.

I testimony whereof, I, the said ANDREW HARTUPEE, have hereunto set my hand.

ANDREW HARTUPEE.

Witnesses:

A. S. NICHOLSON,
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