

JAMES S. BALDWIN.

Improvement in Engines operated by Heated Liquids.

No. 121,479.

Patented Dec. 5, 1871.

Fig 2.

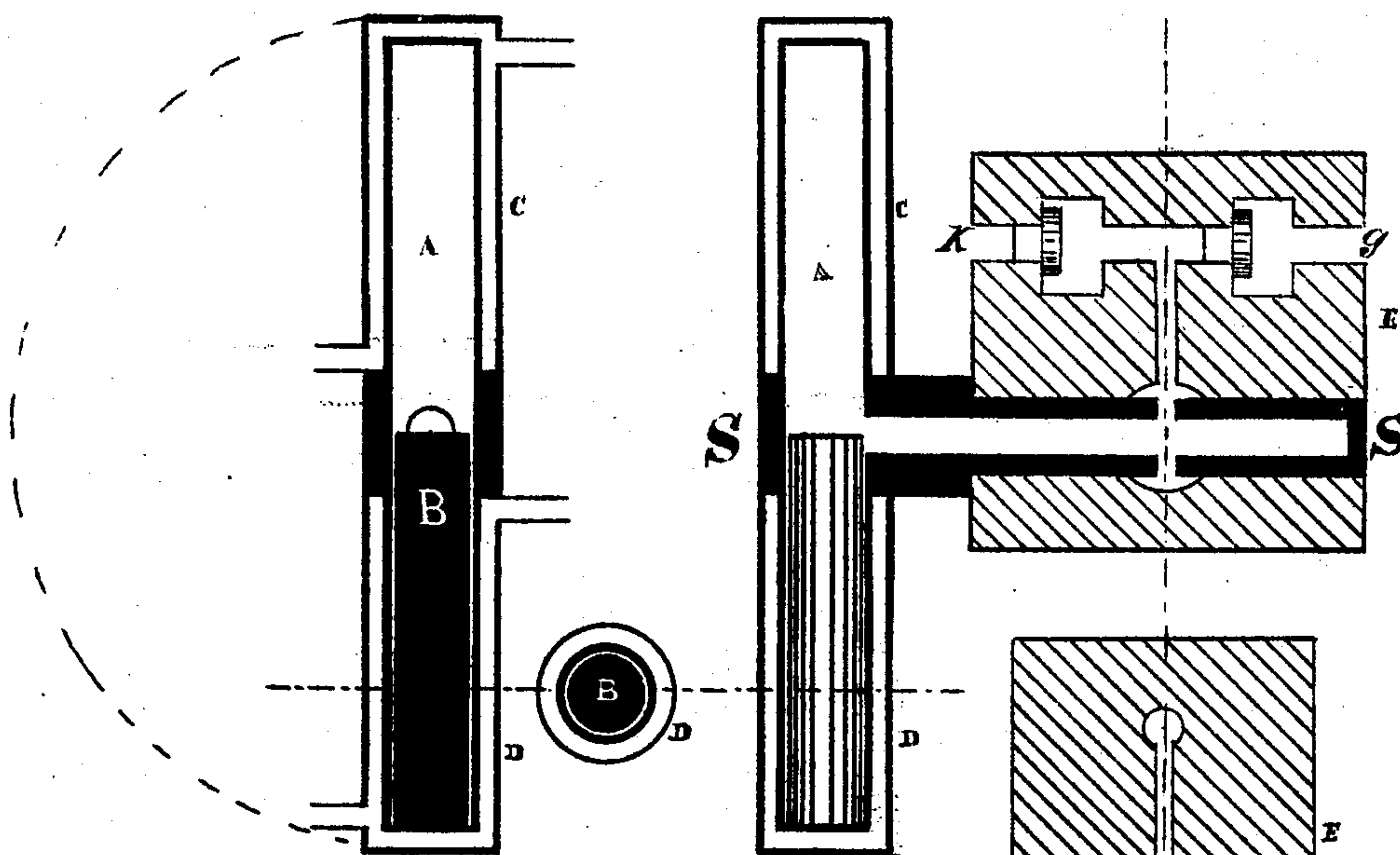
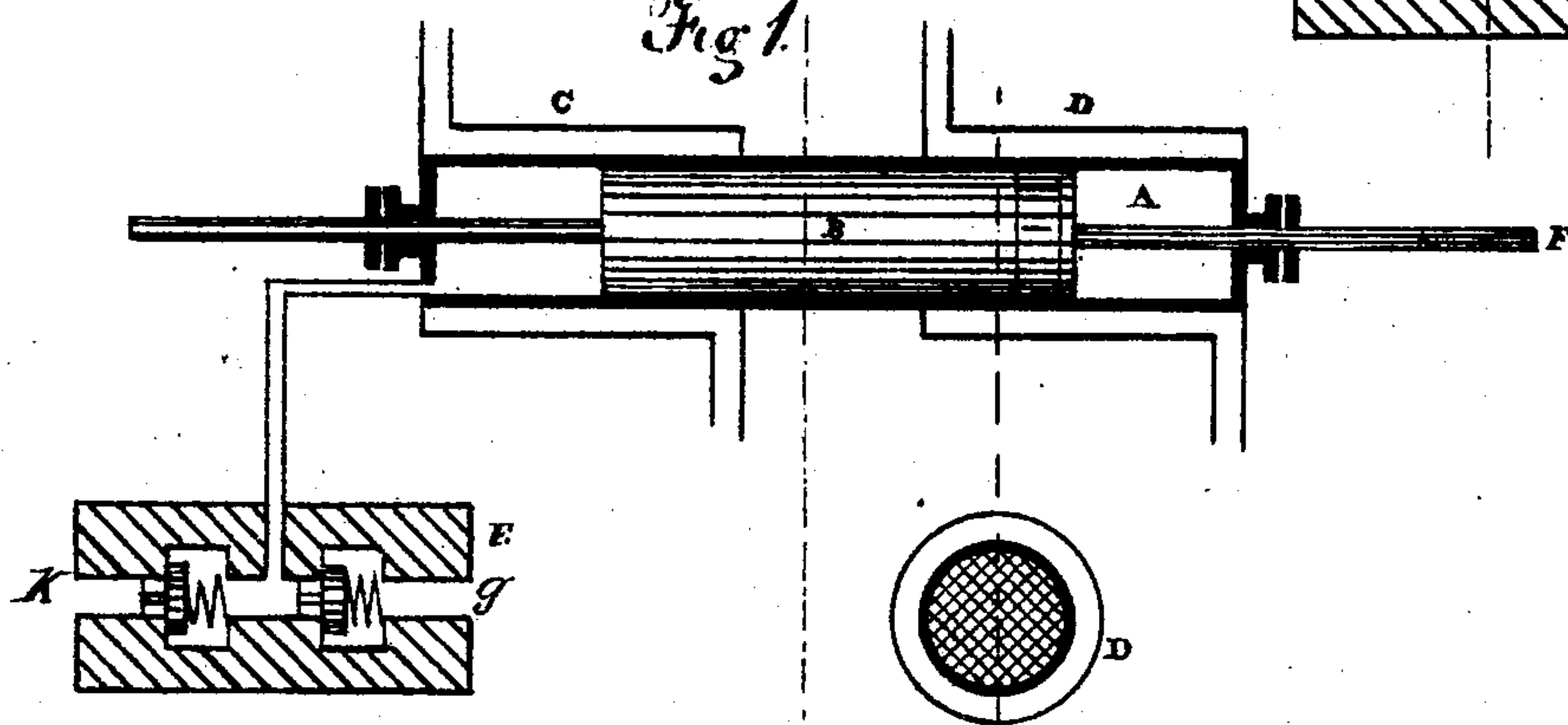


Fig 1.



Witnesses.

Wm. T. Lindley  
Chas. C. Skinner

Inventor.

James S. Baldwin



# UNITED STATES PATENT OFFICE.

JAMES S. BALDWIN, OF NEWARK, NEW JERSEY.

## IMPROVEMENT IN ENGINES OPERATED BY HEATED LIQUIDS.

Specification forming part of Letters Patent No. 121,479, dated December 5, 1871.

*To all whom it may concern:*

Be it known that I, JAMES S. BALDWIN, of Newark, Essex county, New Jersey, have invented an Apparatus for Controlling the Temperature of Liquids for the Production of Power, of which the following is a specification:

My invention enables me to alternately heat and cool a sufficient body of any suitable liquid in such a manner that its overflow, by reason of its expansion by heat, can only take place through a specific channel, and this result can be obtained in almost every case with no expenditure of power other than that required to overcome the friction of moving parts. There are many liquids that may be employed in my apparatus, and for obvious reasons that liquid will give the best results which expands the most with a given rise of temperature, all other things being equal; but as I have obtained good results in the use of cotton-seed oil, I shall for brevity regard oil as a representative liquid. I effect the alternate heating and cooling of a suitable body of oil by shifting it from the cool to the warm part of a vessel, and vice versa. This movement of the oil is brought about by the movement of a displacing agent, preferably a solid, which may be actuated by the direct action of an external force, or by gravity acting through a changed position of the containing-vessel. The displacing body may be a solid or a mass of wires compactly joined, the oil passing through their interstices.

In the drawing the several parts are shown principally in section, and for facility of illustration the frame-work, which possesses no points of novelty, is omitted.

A, in Figure I, is the cylinder containing the oil, and B, the displacing-body, in this case a roll of wire-guaze, one end of which is wrapped with fibrous packing. B is actuated by the piston-rod F, as shown, and through this rod receives a regular reciprocating motion from any suitable source. C is a jacket, kept filled with exhaust steam from an engine, hot water from a condenser, or other cheap source. The jacket D is similarly supplied with water or other cooling medium. In this way one portion of A will always be cold and another hot, consequently the greater portion of the oil, being alternately transferred from one end to the other, will be alternately heated and cooled. E is a block, provided with two valves, as shown. The inlet valve is provided with a pipe, attached at *k*, connecting it with an accumulator, elevated tank, or

other source of supply of cold oil; a pipe, connected at *g*, leads to the point of application. When the oil expands by heat the overflow takes place through *g*, and upon its subsequent contraction the vacancy is supplied with cold oil through *k*, under a pressure from the source referred to, just sufficient to insure its entrance into A.

In Fig. II the functions of the several parts are the same as in the preceding case, except that A is hung upon a hollow spindle, S S, mounted in E, thus enabling B to fall through the oil when A is turned through half a revolution. The jackets C and D should in this case be connected with their respective sources of supply by flexible tubing. The materials employed and the methods of construction, both as regards fixed and working parts, should be substantially the same as those used in hydraulic work of good quality, and the frame-work should be strong and rigid. A particular description of these details, which possess no novelty as I employ them, is not necessary to explain my invention, and is therefore omitted. Liquid sulphurous acid, liquid carbonic acid, and many other liquids having a high rate of expansion may be employed in this apparatus. In using very volatile liquids it is sometimes desirable to employ my accumulator as a reservoir for the cold liquids; but I shall not particularly describe any subsidiary apparatus, inasmuch as my invention relates exclusively to the heating and cooling of the liquid, and not to its manipulation prior or subsequent to that operation.

The useful effect produced by my apparatus consists in its delivery through *g* of an intermittent current of liquid under very high pressure, available for any mechanical purpose where a high liquid pressure is required. I have practically demonstrated that twenty-five cubic inches of cotton-seed oil heated from 70° to 212° Fahrenheit will force a piston three-quarters of an inch in diameter two and five-eighths inches against a pressure of five tons per square inch.

I claim—

The arrangement and combination of the cylinder A, piston B, valve-chest E, and valves controlling the passages *g* and *K*, substantially as described, and for the purpose of constituting an apparatus for controlling the temperature of liquids, as herein set forth.

JAMES S. BALDWIN.

Witnesses:

MORRIS B. LINDSLEY,  
CHAS. H. SKINNER.

(2)