

UNITED STATES PATENT OFFICE.

THEODORE S. BROOKS, OF GARRISON, NEW YORK.

IMPROVEMENT IN APPARATUS FOR HEATING BUILDINGS BY COMPRESSED AIR.

Specification forming part of Letters Patent No. **214,097**, dated April 8, 1879; application filed February 13, 1879.

To all whom it may concern:

Be it known that I, THEODORE S. BROOKS, of Garrison, in the county of Putnam and State of New York, have invented certain new and useful Improvements in Heating Buildings by Compressed Air; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in heating buildings by compressed air; and it consists in compressing the air, by means of a suitable engine, into a receiver, where it is heated both by the exhaust-steam from the engine, and by the products of combustion from the furnace under the steam-boiler, after which the air is superheated by steam, and then conveyed all over the building by means of pipes, the same as steam, as will be more fully described hereinafter.

By the use of air instead of steam, a great saving is effected in fuel and labor; there will be no leakage of water at the joints of the pipes and stuffing-boxes; there will be no freezing of water in the pipes, and the constant noise in the heaters will be entirely done away with.

Figure 1 is a plan view of my invention, partly in section. Fig. 2 is a side elevation of the same, and Fig. 3 is an end view.

a represents an ordinary tubular steam-boiler, under which the fire is built in the furnace *b*. The products of combustion pass from the furnace to the rear end of the boiler, and then back through the tubes *c* to the front end, through the flue *d* in the brick-work, and through a suitable pipe or connection into the large flue *e* in the receiver *f*, and thence up the chimney. After steam is raised in the boiler, it is used to run a compressing-engine of any desired construction for the purpose of compressing air to any desired extent in the receiver *f*. This receiver is also set in suitable brick-work, as shown, and is much larger than the boiler beside which it is placed. In this receiver is placed a series of heating-pipes, *g*, into which the exhaust-steam from the engine is passed through the pipe *h*. This steam, after passing through the heating-pipes

g and heating the compressed air in the receiver, in addition to the heat received from the waste products of combustion, passes out through the pipe *i*.

In order to keep the air in the receiver from becoming too dry, a jet of live steam is kept constantly escaping into the receiver through the pipe *j*.

Over the top of the boiler, and connected directly thereto by any number of suitable pipes, is the superheater *l*. In this heater is placed a series of tubes, that are heated by the live steam from the boiler, and through which tubes the compressed air from the receiver passes on its way to the building to be heated. The ends of these tubes *n* are not secured in the ends of the heater, but in the interior heads, *o*, between which heads *o* and the ends of the heater there is left a suitable space, *q*, for the purpose of changing the direction of the air as it comes from the receiver, and causing it to pass twice the length of the tubes before it escapes, which reversal is accomplished by passing the air through one part of the pipes, and then passing it back to the starting end through the other part or set of pipes. For the purpose of thus causing the compressed air to pass twice through the tubes, a division, *r*, is placed in one end of the heater, thus dividing the tubes into two sets. Whether the compressed air is admitted from above or below, it can only escape from the heater after twice traversing the length of the tubes, by which time the air will be almost as hot as the steam itself. Upon both the heater and the receiver will be placed a safety-valve, in order to prevent explosions.

The arrangement of the pipes for conveying the compressed air from the engine to the receiver, for the passage of the exhaust-steam and of the compressed air to the heater, may be a matter of choice, as they may be arranged in a number of different ways.

The apparatus above described may be added to any steam-boiler which is now being used for heating by steam.

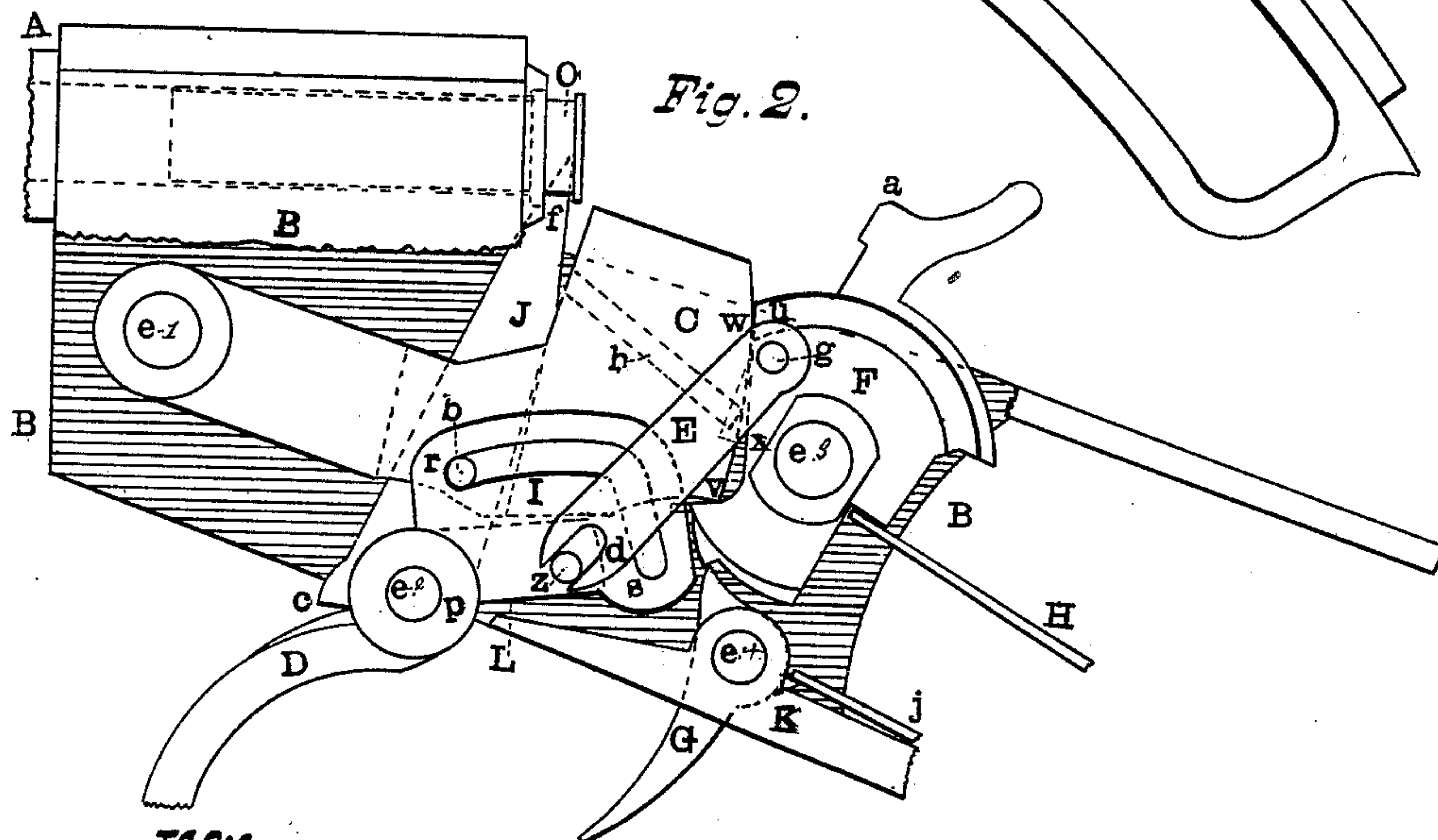
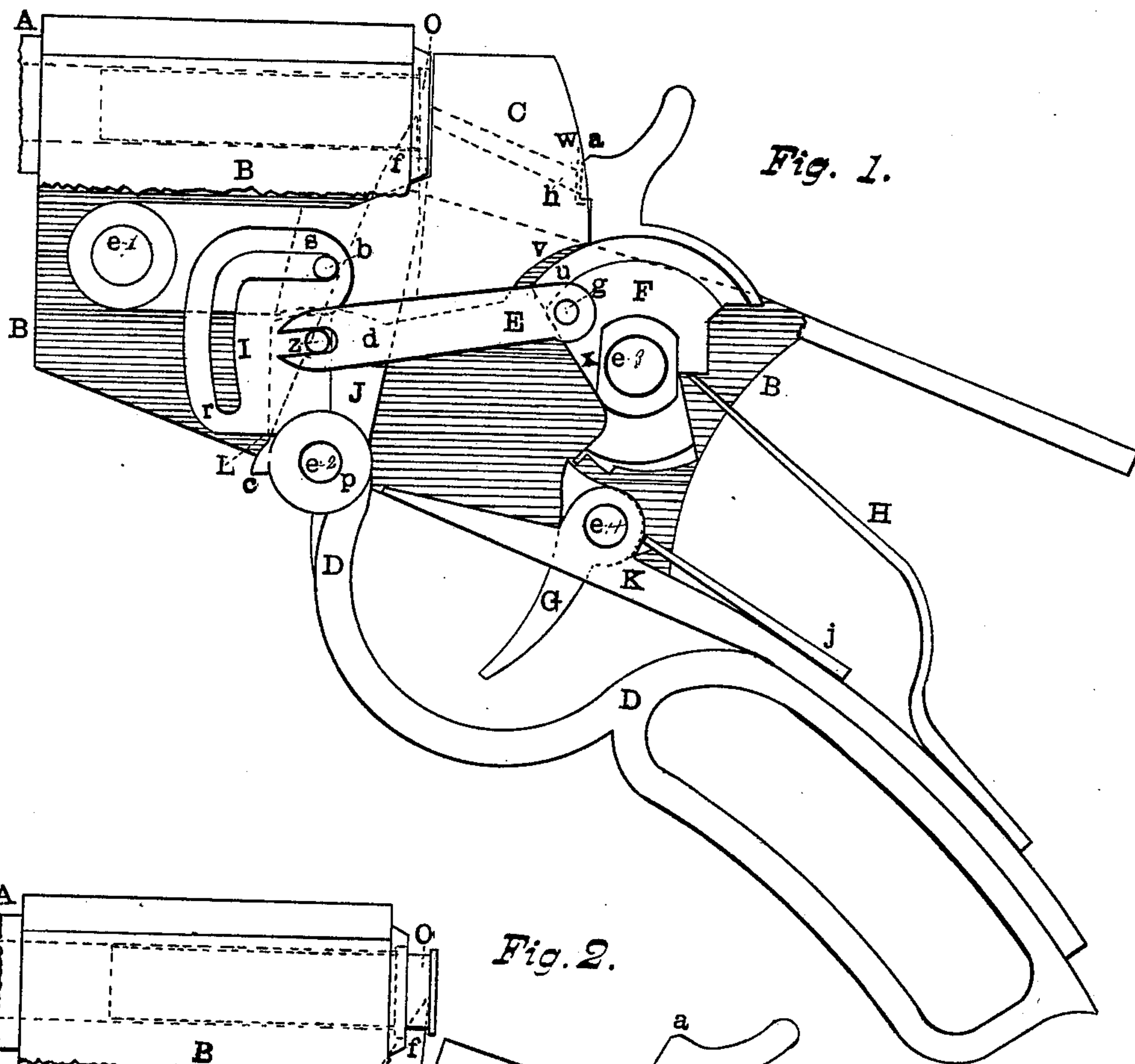
Having thus described my invention, I claim—

1. In an apparatus for heating buildings by compressed air, the combination of a steam-boiler, a receiver into which the air is com-

H. A. BUCK.
Breech-Loading Fire-Arm.

No. 214,098.

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