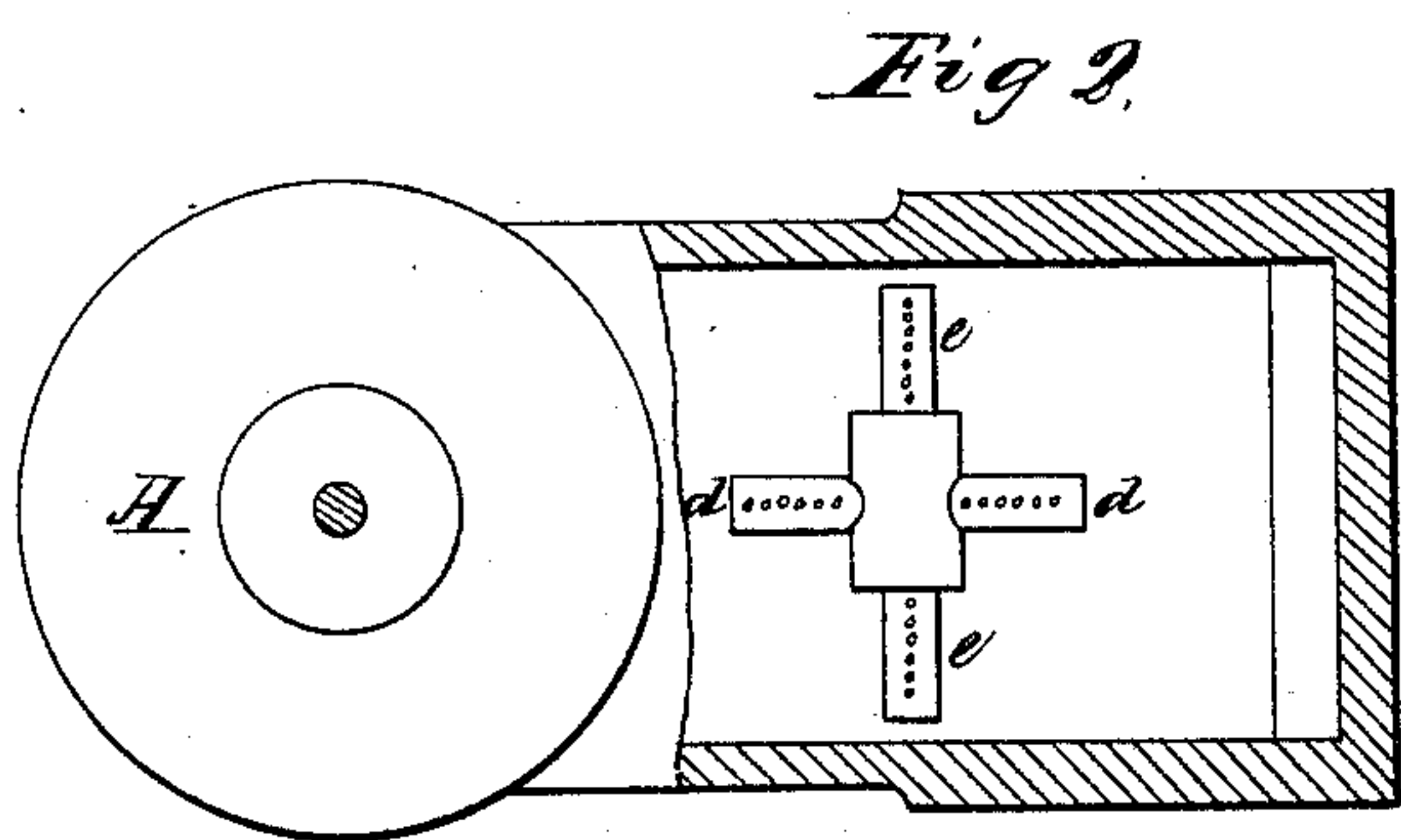
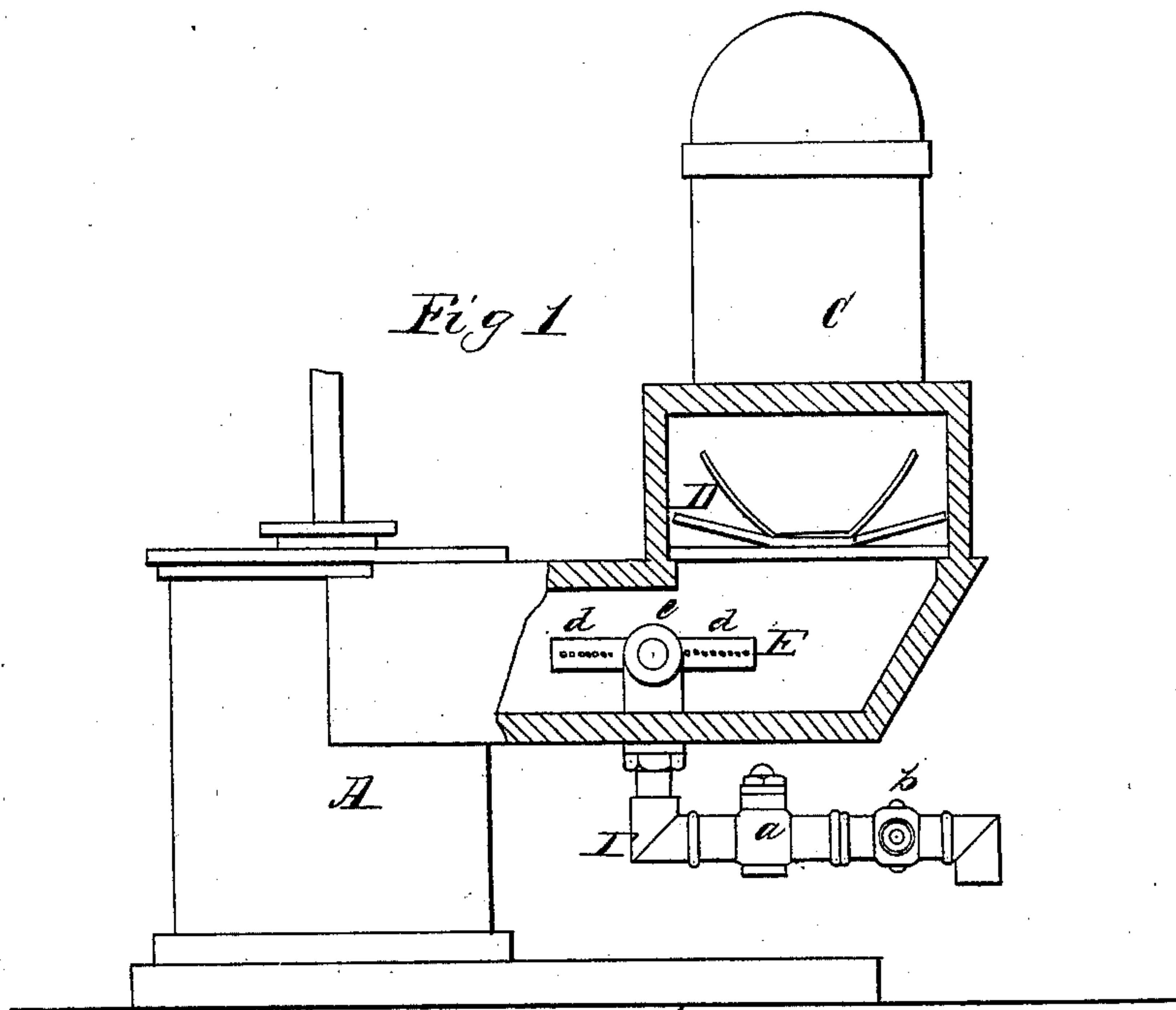


J. M. Spiegle,
Steam-Boiler Condenser.
No 45,941. Patented Jan. 17, 1865.



Witnesses,
Charles E. Foster
Wm. Albert Starr

Inventor.
J. M. Spiegle
By Henry Rowson
Atty

UNITED STATES PATENT OFFICE.

JOHN M. SPIEGLE, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN CONDENSERS.

Specification forming part of Letters Patent No. 45,941, dated January 17, 1865.

To all whom it may concern:

Be it known that I, JOHN M. SPIEGLE, of Philadelphia, Pennsylvania, have invented an Improvement in Condensing Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists in the use, in connection with the air-pump of a condensing steam-engine, of the perforated tubes hereinafter described, or their equivalents, for introducing jets or streams of air into the water as it is forced by the air-pump toward the discharge-valve, thereby converting the water into spray and preventing the injurious effects which a violently-impelled unbroken volume of water has on the valves.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe the manner of carrying it into effect.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a side view of the air-pump and hot-well of a condensing steam engine; Fig. 2, a plan view partly in section.

A represents an ordinary air-pump, such as is used in connection with marine condensing-engines, C being the hot-well, D the discharge-valve, and E the passage from the air-pump to the hot-well.

It is well known that in condensing steam-engines the volumes of water suddenly raised by the air-pump and forcibly impelled by the latter through the passage into the hot-well cause sudden jars, and have an injurious effect on the valves, the latter being frequently cut and torn; especially is this the case with the discharge-valve D, which has to receive

the full force of a violently-impelled volume of water.

At any suitable point between the discharge-valve D and the air-pump I introduce the air-pipe F, which is furnished with an ordinary check-valve, *a*, and a common stop-cock, *b*, for regulating the passage of air through the pipe. On that end of the pipe which projects into the passage E are the two perforated tubes, *d* and *e*, arranged at right angles to each other.

As the water raised by the bucket of the pump takes its course through the passage E, it is met by jets of air passing through the perforations of the tubes *d* and *e*, which, becoming intimately mixed with the water, cause it to assume the form of spray, the effect of which on the valves is innocuous, compared with that of a forcible unbroken volume of water.

Instead of the perforated tubes *d* and *e*, a simple perforated air-chamber communicating with the air-pipe F may be used; in fact, jets or streams of air may be introduced at the desired point by a variety of devices differing in form from but having the same effect as that described.

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

The use, in connection with the air-pump of a condensing steam-engine, of the perforated tubes *d* and *e*, or their equivalents, for introducing jets or streams of air into the water as it passes from the air-pump to the hot-well, as set forth.

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

Witnesses: JOHN M. SPIEGLE.
HENRY HOWSON,
JOHN WHITE.