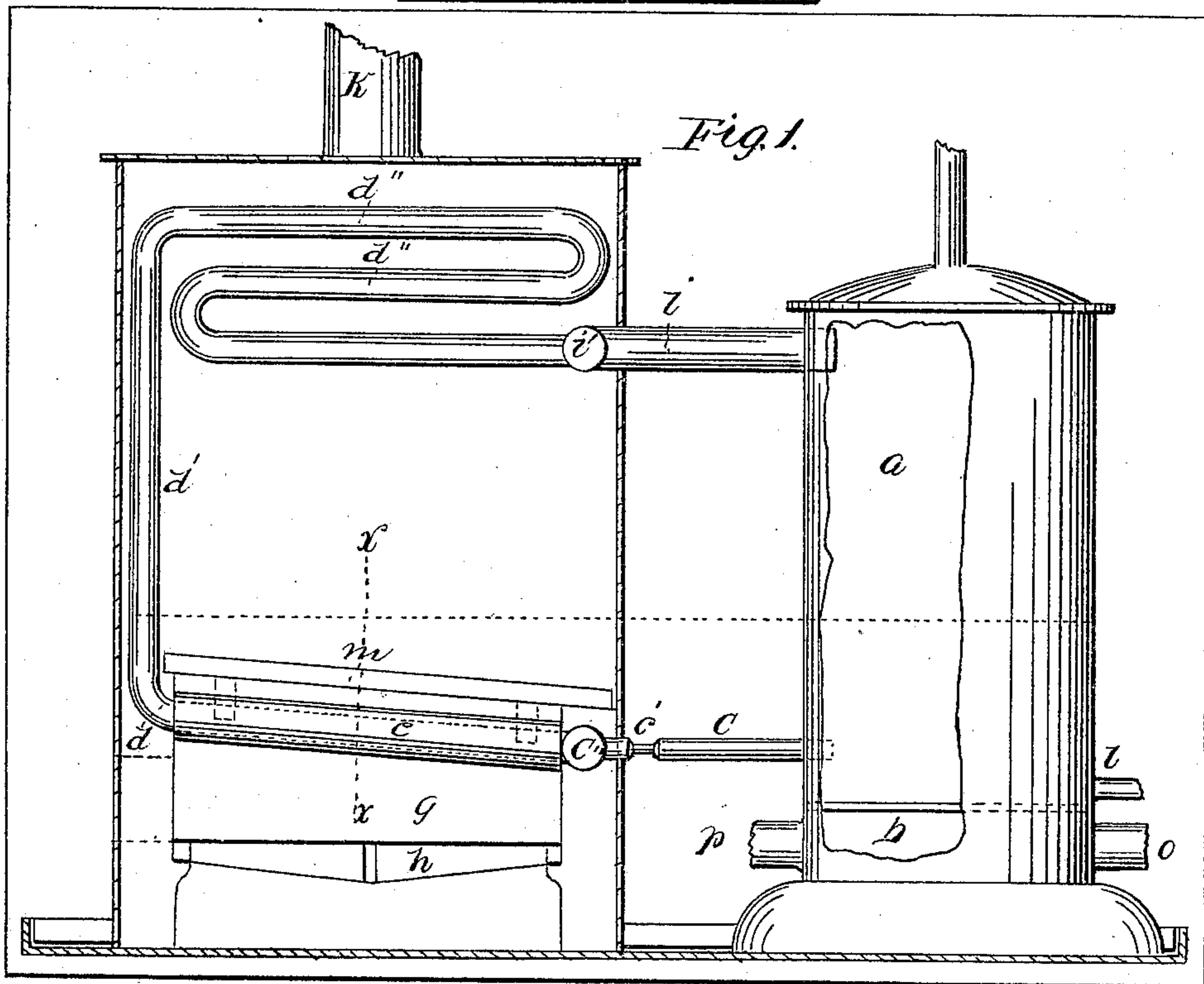
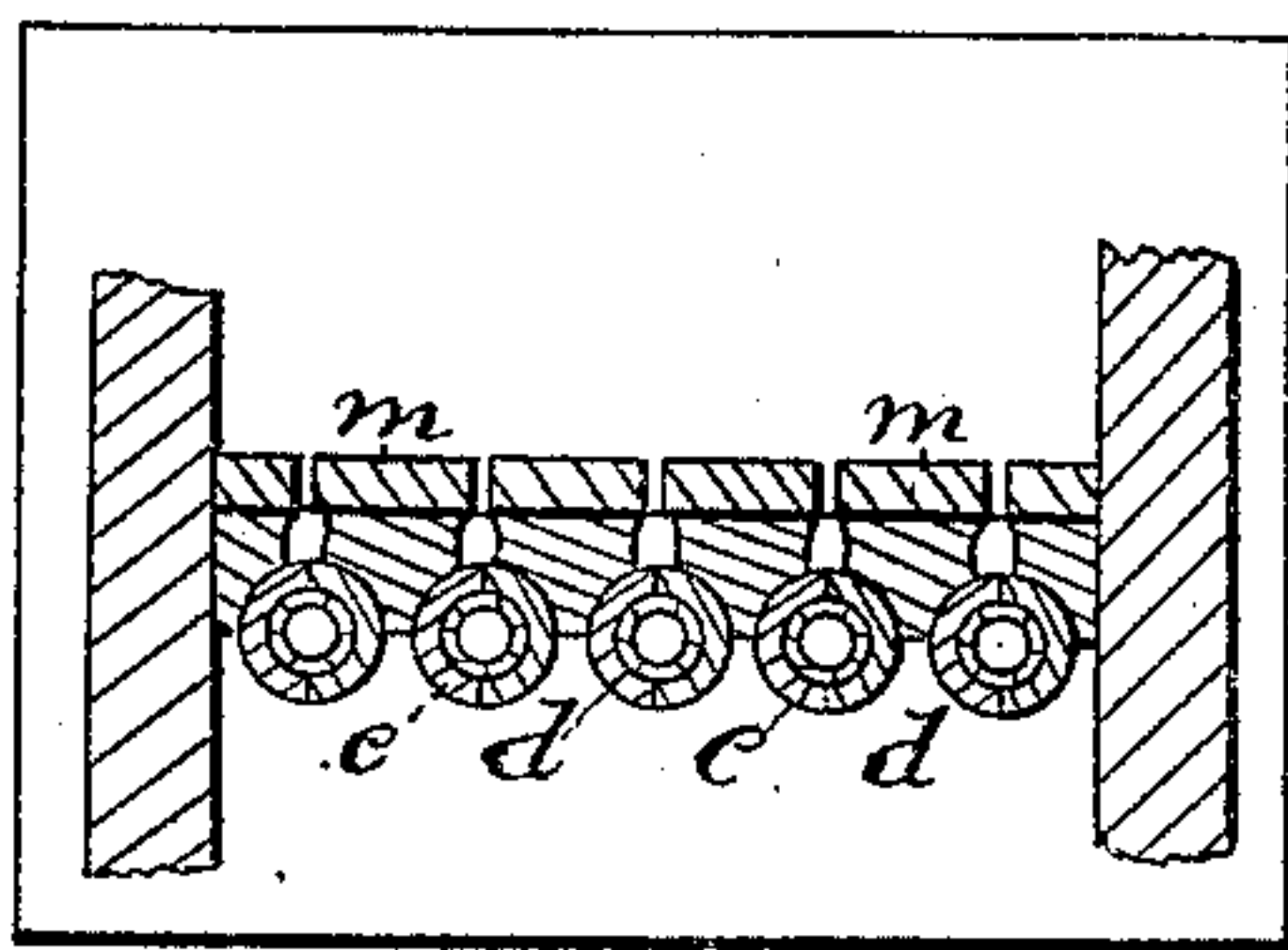


G. B. Bracyton,
Steam-Boiler Water-Tube.
N^o 44,597. Patented Oct. 11, 1864.

Fig. 2.



Witnesses:

A. H. H. H.

Robert E. North.

Inventor.

Geo. B. Bracyton.

UNITED STATES PATENT OFFICE.

GEORGE B. BRAYTON, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 44,597, dated October 11, 1864.

To all whom it may concern:

Be it known that I, GEORGE B. BRAYTON, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful improvements in steam-generating apparatus, which results in giving perfect safety from the dangerous and damaging effects of explosions, thus dispensing with that constant attention heretofore rendered necessary in the production of steam, economy in the consumption of fuel, and economy in construction as compared with the ordinary forms of steam-generating apparatus.

These new and valuable results are obtained through a series of inventions fully described in this and other Letters Patent granted to me and bearing even date with this, each and all of which inventions may be used independently of each other, and are therefore made the subject of separate patents. Each specification is descriptive of only so much of the accompanying drawings as is necessary to understand fully the particular improvement under discussion; but the different specifications, when taken in connection, make a complete description of the whole apparatus.

The following specification has relation to one of the improvements, termed the "intercepting" and "transmitting" medium in a steam-generating apparatus; and the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings.

Figure 1 is a side view of the generator. Fig. 2 shows a section across the generating-vessels at *x x*.

Like letters refer to like parts.

g represents the fire-space; *h*, the grates; *d*, the water-vessel or vessels for the generation of steam, formed in this case of wrought-iron tubes or gas-pipe put together in the ordinary manner. These vessels or pipes are all connected at one end with a horizontal water-vessel, *c''*, at right angles with them. This vessel *c''* receives the supply of water and distributes it to the several generating-vessels, which are connected at their other end with upright vessels, *d'*, which ascend about two feet, and then are bent into the form shown in the drawings, forming a series of horizontal pipes. Steam is allowed to pass off at the point *i'*.

In Fig. 2, *e e* are the intercepting or transmitting mediums intervening between the

water-vessels and the fire. In this instance they are made to conform to the external shape of the water-vessels and to come into contact with the same. They are about one-half inch in thickness, and are divided into two pieces lengthwise, so as to be readily removed and replaced. They can be kept in place by small pieces of metal wedged between them. This medium is made of any suitable material which will best endure the action of the fire; cast-iron answers a good purpose, as a rapid forced combustion is avoided in this apparatus.

The generator as described may be inclosed by brick-work or cast-iron plates lined with some non-conducting material.

The object of the employment of the intercepting and transmitting medium or the result to be obtained from its use in a steam-generating apparatus can be explained as follows:

To secure economy in a steam-generator, it is requisite, after endeavoring to obtain a perfect combustion of the substance used as fuel and thus evolve or give out all the heat possible to obtain from it, to transmit that heat at once to water, in order that none be lost by passing off with the unconsuming gaseous products of combustion, by radiation, by mixture with an excess of air in the furnace, or by any other means. Now, to meet this requirement, it is necessary to bring the water-vessel into close contact with the fire, in order to absorb the heat as soon as it is generated; but to do this prevents perfect combustion, from the fact that gases will not properly ignite while in contact with this surface, which cannot be heated much above the temperature of the water it contains. I have discovered a means of overcoming this difficulty, and retain the water-vessel in the flame of the fire by the use of the medium *e e* to intervene between the fire and the generating-vessels to intercept and transmit the heat. This medium, while acting in this capacity, becomes heated to a high degree, thus permitting a proper combustion of the gases in contact with it. In transmitting heat thus directly to the water-vessel in the flame of the fire, I make use of a slow natural combustion, preventing thereby the escape of a large amount of heat to the chimney.

The action of this whole apparatus, as described, in the generation of steam is as follows: Water is supplied to the generating-

vessels by any suitable means whereby they may receive a sufficient and regular supply, (the plan which I have adopted is explained in my patent for a safety supplemental steam and steam and water vessel, bearing even date with this,) and then is allowed to rise in the upright vessels to any determined height. Heat from the fire *g* acts first upon the vessels *d* through the medium *e*, as above explained, and then passes up and among the horizontal pipes *d''* on its way to the chimney *k*. Steam, when generated in the vessels *d*, passes up and into the series of horizontal pipes, in which any water is converted into steam which may be carried up into them by the rapid rush of steam up the upright pipes.

In the form of generator which I have described, consisting of a series of pipes placed in the flame of the fire, I have given them a sufficient inclination upward from the point where they receive the supply of water to the point where they join the upright pipes to cause or allow steam, when generated, to flow in that direction.

In proportion to the quantity of steam generated the cost of this apparatus is much less than any form of steam-generator.

Having thus fully described my invention, I wish it to be distinctly understood that it does not consist in the use of any particular form of the vessel or vessels for the generation of steam, neither is it necessary that a vessel should be wholly surrounded by a medium; but I shall state my claim as follows:

In an apparatus in which steam is generated in tubes having a constant supply of water, in combination with said tubes, the surrounding of the same with tubes capable of being highly heated, so that complete combustion of the gases emanating from the fuel, and while in contact therewith, may be effected while its temperature is transmitted to the steam-generating tubes, as herein set forth.

GEO. B. BRAYTON.

Witnesses:

A. G. UTLEY,
ROBERT E. NORTHAM.