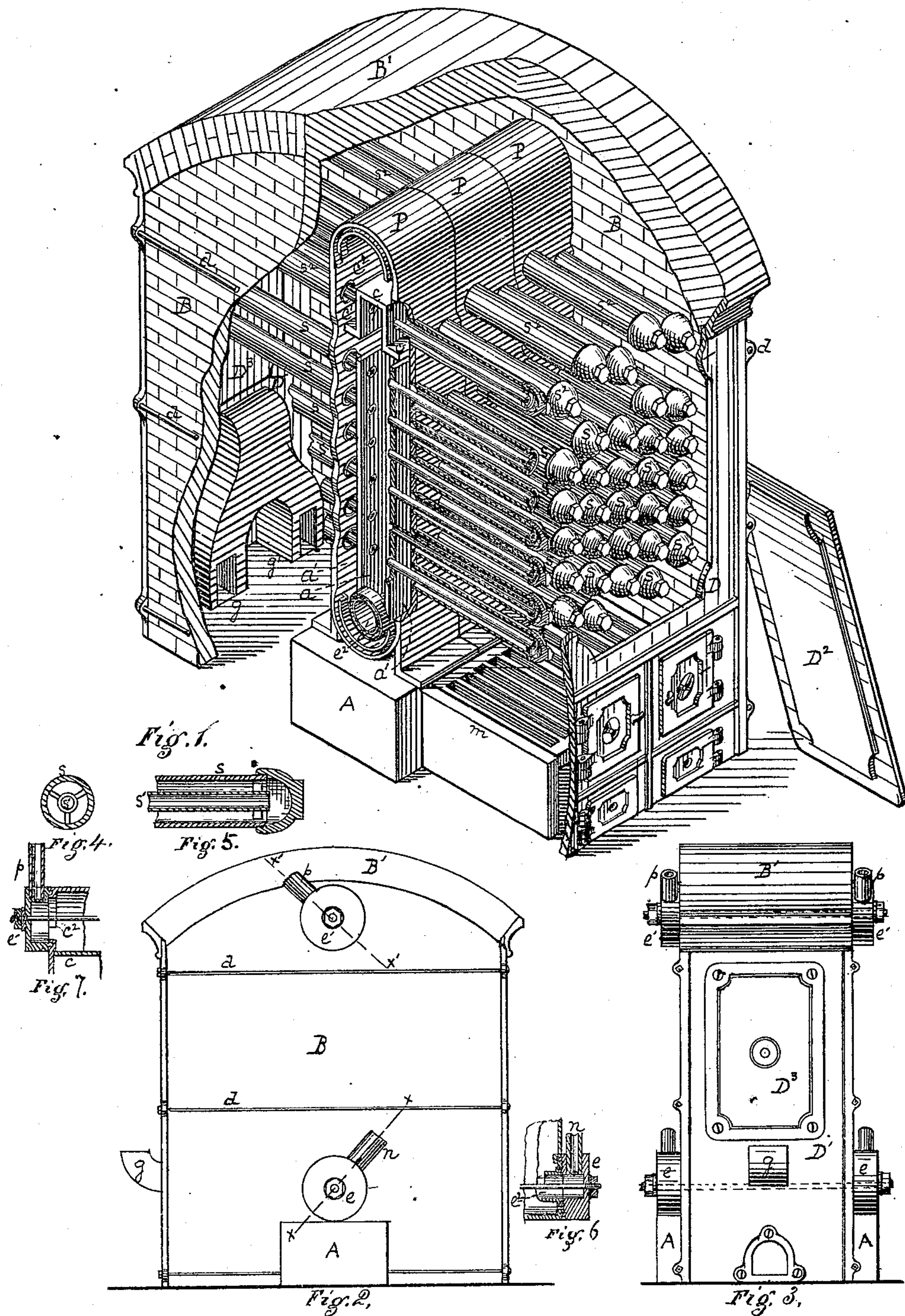


E. M. BUTZ & G. M. JONES.

Sectional Steam-Generator

No. 164,072.

Patented June 8, 1875.



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UNITED STATES PATENT OFFICE.

EDWARD M. BUTZ AND GEORGE M. JONES, OF ALLEGHENY, PA.

IMPROVEMENT IN SECTIONAL STEAM-GENERATORS.

Specification forming part of Letters Patent No. **164,072**, dated June 8, 1875; application filed May 5, 1875.

To all whom it may concern:

Be it known that we, EDWARD M. BUTZ and GEORGE M. JONES, of Allegheny, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Steam-Generators; and we do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a perspective view of our improved apparatus with a portion of the end and side walls and the arch removed or broken away, the end plate of the central water-chambers removed, and a set of the steam-generating pipes in section. Fig. 2 is a side elevation of the apparatus. Fig. 3 is an end elevation thereof. Fig. 4 is an enlarged cross-section of one of the steam-generating pipes. Fig. 5 is an enlarged longitudinal section of the outer end of one of the same pipes. Fig. 6 is a section of the end of the supply-drum in the line $x x$, Fig. 2; and Fig. 7 is a like view through the line $x' x'$, Fig. 2.

Our improved steam-generator, while adapted for the usual purposes for which steam-generators are employed, is especially designed for use in connection with steam-heating apparatus.

The side walls B are, preferably, made of brick, as also the arch B'; but the end walls D D' we usually make of cast-iron, or of a cast-iron frame like that of a stove front, such frames being for greater security and strength connected by stay-rods d . The front wall or frame D is fitted with the usual doors, which open into the fire-chamber and ash-pit, and each frame has one or more removable or swinging panels, D² D³, arranged opposite the steam-generating pipes, so that the latter may be more conveniently accessible for cleaning, removal, and repairs. The parts thus designated constitute a close furnace-chamber, inside of which is the steam-generator proper. Transversely across the furnace-chamber we build any suitable foundation, A. On this we mount a sheet-metal case, or a series of such cases, P. Each case contains one central and two side water chambers, $a a' a'$, extending up to or nearly to the water-level. Still above is

another series of like chambers, $c c^1 c^1$, though of less vertical height, the center one, c , being open below, and the side chambers c^1 each opening into the dome c^2 . This dome at each end is extended out, outside the side walls B, and is closed by a cap, e^1 , and a like construction is represented at the lower ends of the water-chambers $a a' a'$, as shown at e . This lower end is also of a dome-form, inverted. A little above its bottom a drum, e^2 , extends directly across, but so as to leave a U-shaped communicating passage beneath from one chamber a' to the other a' . Such drum on its upper side opens into the central chamber a . The ends of the drum are closed by the caps e . Into the outer walls of the water-chambers a' I screw or otherwise secure a series of steam-generating pipes, s , each closed at its outer end by a screw-cap, as shown. Into the inner walls of these chambers we secure in like manner a series of smaller tubes, s^1 , the latter being arranged axially in the former, with enough space between them and at their outer ends for the flow of water, as presently to be described. The water enters or is forced from any desired source of supply through the pipe n , into the drum e^2 , through the top openings, in which it rises in the central chamber a till it has reached the desired level. At the same time it flows outwardly from the chamber a through the pipes s^1 , and, returning along the annular space between the pipes $s s^1$, enters the side chambers a' , in which chambers, on account of their free communication with each other beneath the drum e^2 , the water stands at the same level; as also that in a .

A fire being made on the grate-bars m , the work of generating steam is commenced, and goes on in a manner which will be readily understood by those skilled in the art without further description.

The smoke, gases of combustion, heat, &c., pass up between, around, and over the pipes, over the dome p , down between a like system of pipes on the opposite side, and out by the flues $g g'$ to the stack or chimney. The steam thus generated accumulates in the chamber c , whence, by a like arrangement of interior outgoing and exterior return-pipes as that already described and here marked s^2 , it is su-

perheated and discharged into the chambers c^1 . It there passes up to the upper part of the dome, and, by end passages in the caps e^1 , it is conducted to the pipe p , and thence to the place of use.

In the drawing we have not shown all the steam-generating and steam-superheating pipes which may be employed, having for convenience of illustration omitted some; but they may be inserted in any desired number or order.

The continuous flow of water through the pipes will, in most cases, prevent the deposit of sediment, except in the drum e^2 , or in the space below, and for convenience in removing it a man-hole is provided in the cap e , and a like hole in the cap e^1 , if for any reason desired.

The height of the water may be regulated by any suitable means—such as is already known in the art. Each pipe is fastened at only one end, and hence may expand and contract freely without injury. A single shell supplies a double set of pipes, and the parts subject to the destructive action of the fire are easily got at by the removal of the panels D^2 D^3 , and is easily repaired or renewed.

The sections P are cast separately, and each

is separated from the other by a plate cast therewith, or attached by a luted or packed joint thereto, or each section may be cast in separate plates, or made of sections of boiler-plate, such plates or sections being united together in any suitable manner.

We claim as our invention—

1. A vertical central water-supply chamber, a , with a system of pipes, s^1 , leading horizontally therefrom on each side, a system of exterior pipes, s , leading back to the vertical side chambers a' , such parts being arranged and combined substantially as and for the purposes set forth.

2. The central steam-chamber c , in combination with the side chambers c^1 , and with the steam-superheating pipes, arranged substantially as set forth.

In testimony whereof we have hereunto set our hands.

EDWARD M. BUTZ.
GEORGE M. JONES.

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