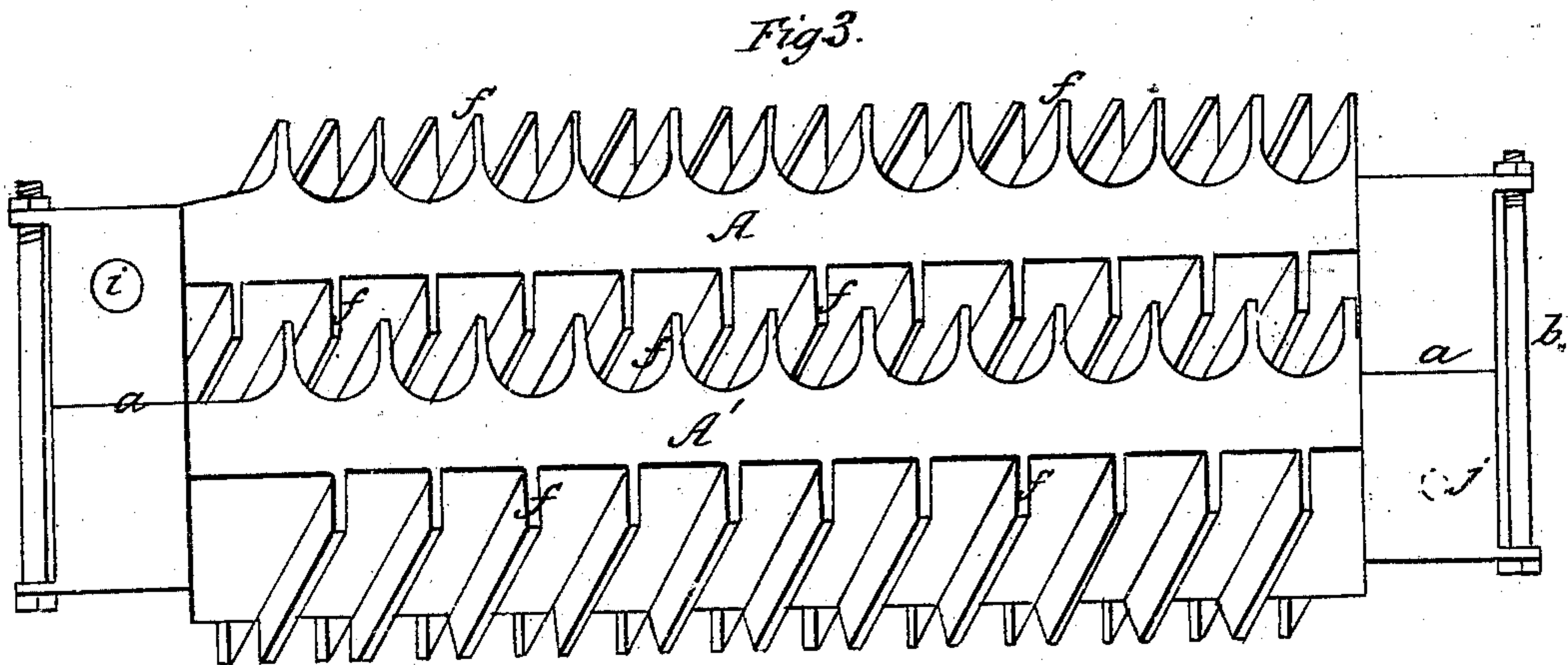
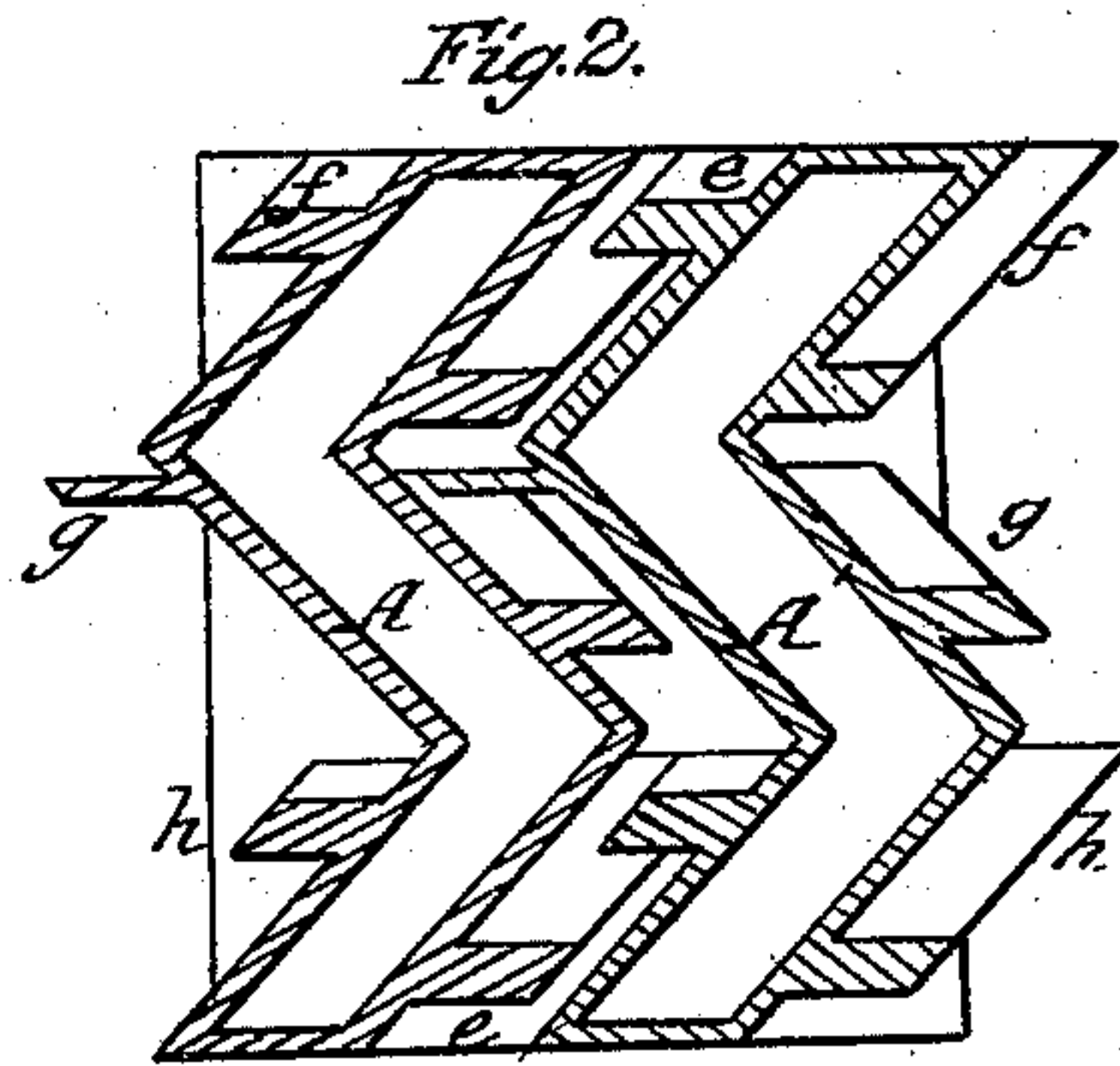
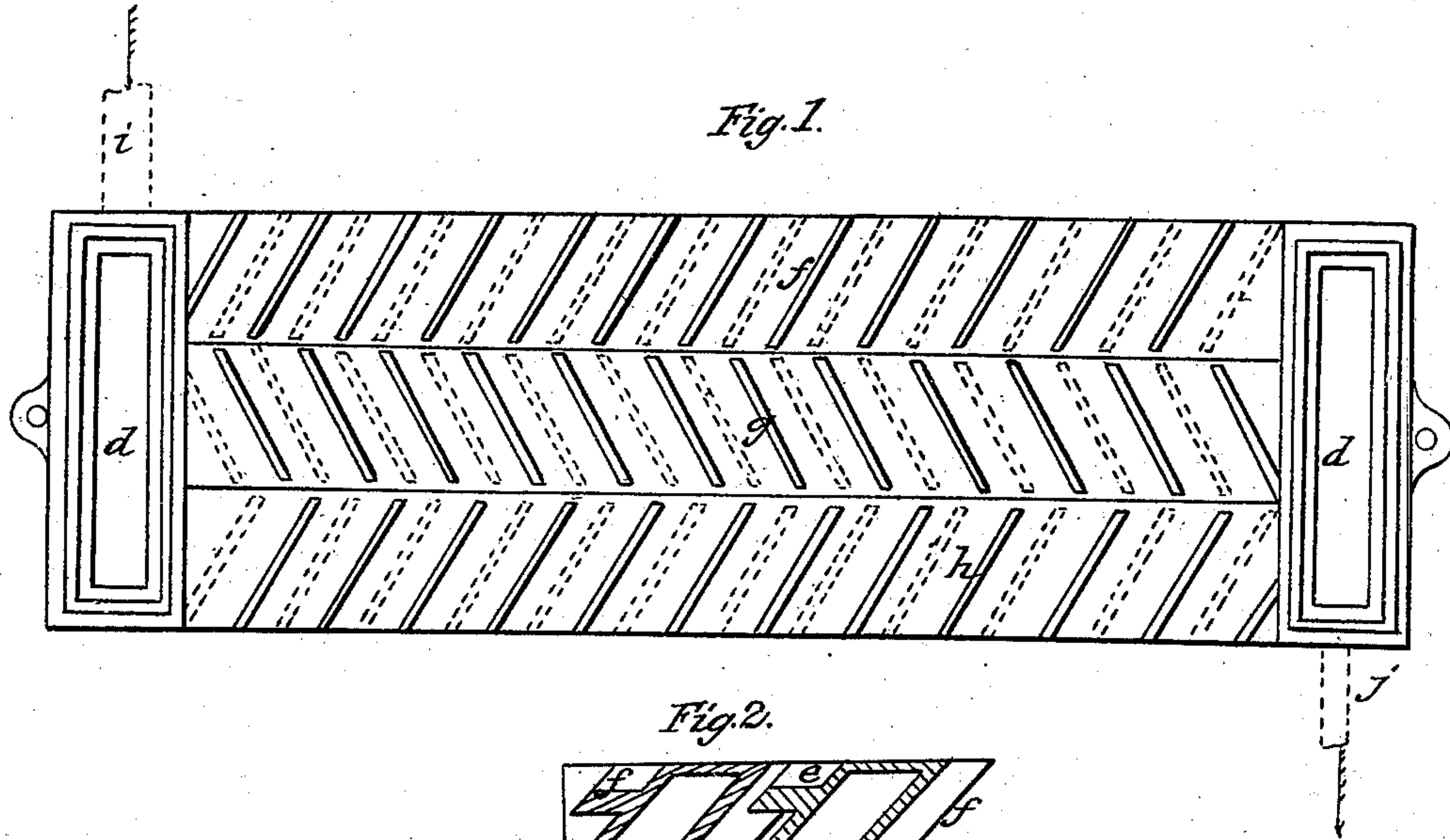


T. B. BELFIELD.

Steam Radiator.

No. 58,202.

Patented Sept. 25, 1866.



Witnesses:

Mr. Albert Steel.  
John Parker.

Inventor.  
T. B. Belfield  
By his Atty  
H. Howson.



# UNITED STATES PATENT OFFICE.

T. B. BELFIELD, OF PHILADELPHIA, PENNSYLVANIA.

## STEAM-RADIATOR.

Specification forming part of Letters Patent No. 58,202, dated September 25, 1866.

*To all whom it may concern:*

Be it known that I, T. B. BELFIELD, of Philadelphia, Pennsylvania, have invented an Improvement in Steam-Radiators; 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 of a steam-radiator composed of a number of hollow steam-heated sections of the zigzag form described hereinafter, there being between the sections zigzag spaces, through which the air passes and in which it is heated by contact with the said sections and with inclined ribs on the same, all substantially as described hereinafter.

The object of my improvement is to make a steam-radiator of limited height, compared with its extended heating-surface, and having tortuous passages, through which the air must pass and become thoroughly heated before it escapes to the distributing-flues.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a side view of one of the sections of my improved steam-radiator; Fig. 2, a transverse section; and Fig. 3 a plan view.

Similar letters refer to similar parts throughout the several views.

The radiator consists of a number of hollow sections of cast-iron, two sections only, A and A', being shown in the present instance.

Each section viewed transversely is of the zigzag form represented in Fig. 2, and the adjacent sections are connected together at the opposite ends by bolts *b b* and packed joints *a a*, at which points one section has a free communication with the other through openings *d d*.

Between the sections are zigzag spaces *e*, and into these spaces project a series of inclined ribs, which I prefer to arrange in the manner best observed on reference to Fig. 1—that is to say, I arrange a series of inclined ribs, *f*, on the highest inclined plane of the zigzag side of one of the sections, and a series of ribs, *f*, on the next inclined plane of the same side, and a series of similar ribs, *h*, on the lowest plane of the same side, one series of ribs being inclined in contrary directions to that of the adjacent series.

Steam is introduced at the top of the outer

section of the series, and at the end of that section—for instance, at the opening *i*—and is permitted to pervade the whole of the interior of the sections, making its escape in a condensed state at an opening, *j*, situated at the end of that section most distant from that to which it first gained access.

Steam being thus circulated throughout the interior of the several sections, the exterior zigzag surfaces, as well as the inclined ribs, become heated, and a corresponding heat must be imparted to the air which passes through the zigzag spaces between the sections to the distributing-flues of the building in which the radiator is situated.

I am aware that radiators consisting of sections with straight sides, and with spaces intervening between the sections, have been used; but in these radiators it was necessary, in order to obtain the desired heating-surface, to make them of a height and bulk which, in many cases, rendered them inconvenient to introduce into buildings.

By making the sections of the zigzag form described, not only is the radiator reduced in height, without any decrease in the heating-surface, but tortuous passages are afforded for the air, which, being thus in a degree retarded, becomes more thoroughly heated than if it took a direct course.

In the sections above alluded to as having flat or straight sides, the latter were studded with a number of small circular projections, it being supposed that they were the best adapted to impart increased heat to the passing air.

I have found in practice that the inclined ribs are preferable, as they serve to increase the heat not only by their own surfaces, but also by rendering the air-passages more tortuous.

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

1. A radiator composed of a number of sections of the zigzag form described, for the purpose specified.

2. The combination of the above with the inclined ribs, for the purpose specified.

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

T. BROOM BELFIELD.

Witnesses:

W. C. BUCHANAN,  
H. W. EVANS.