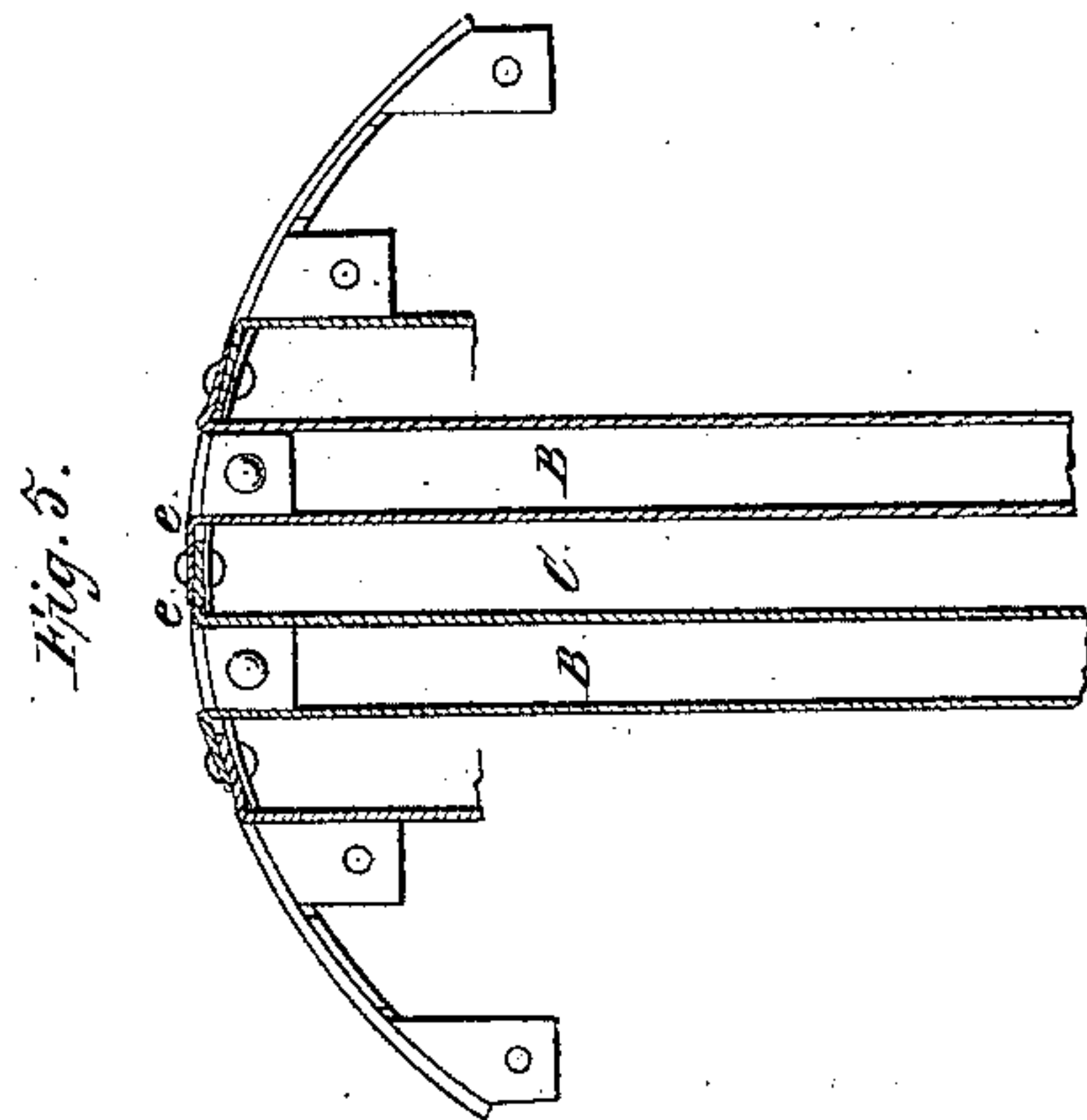
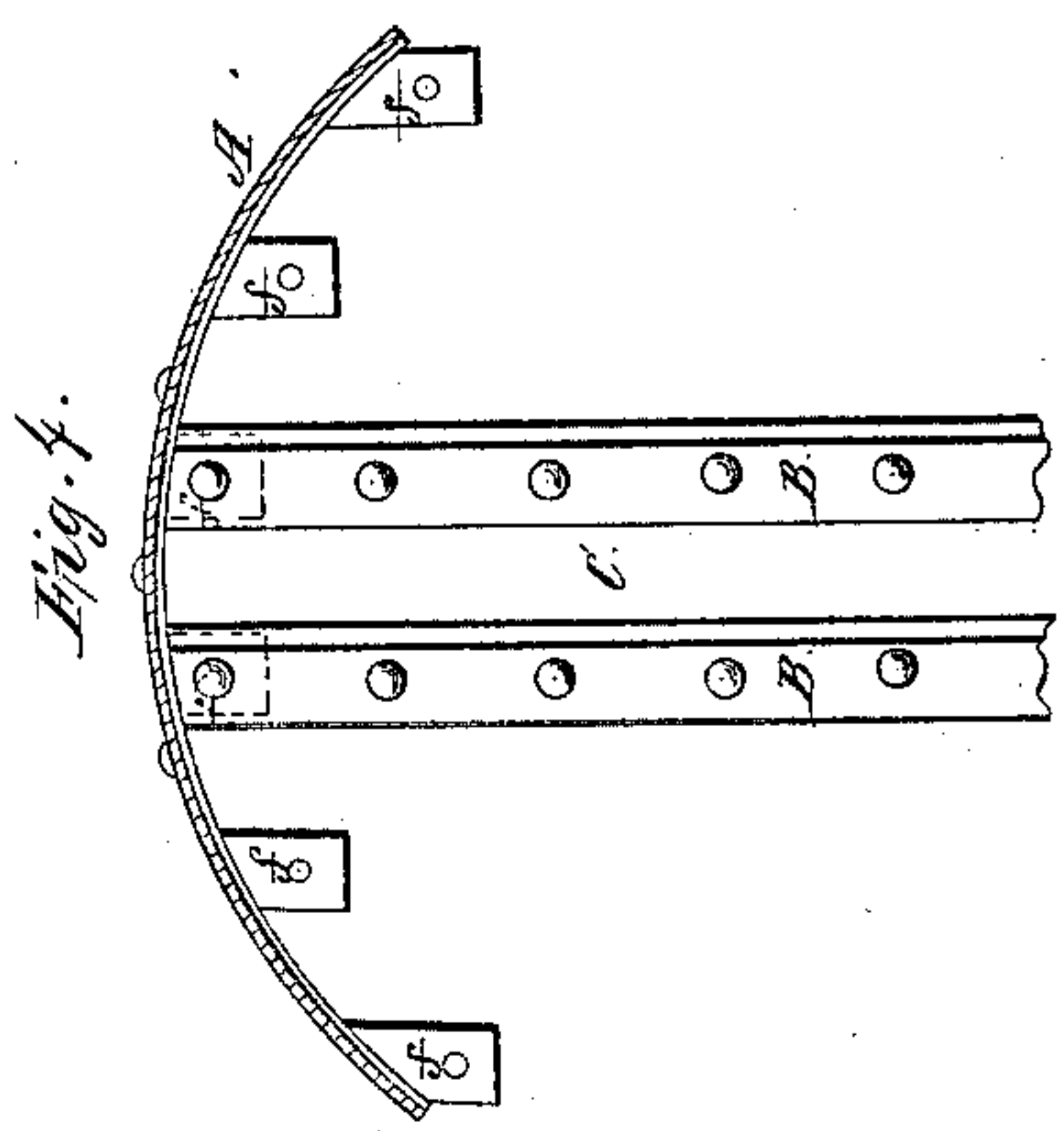
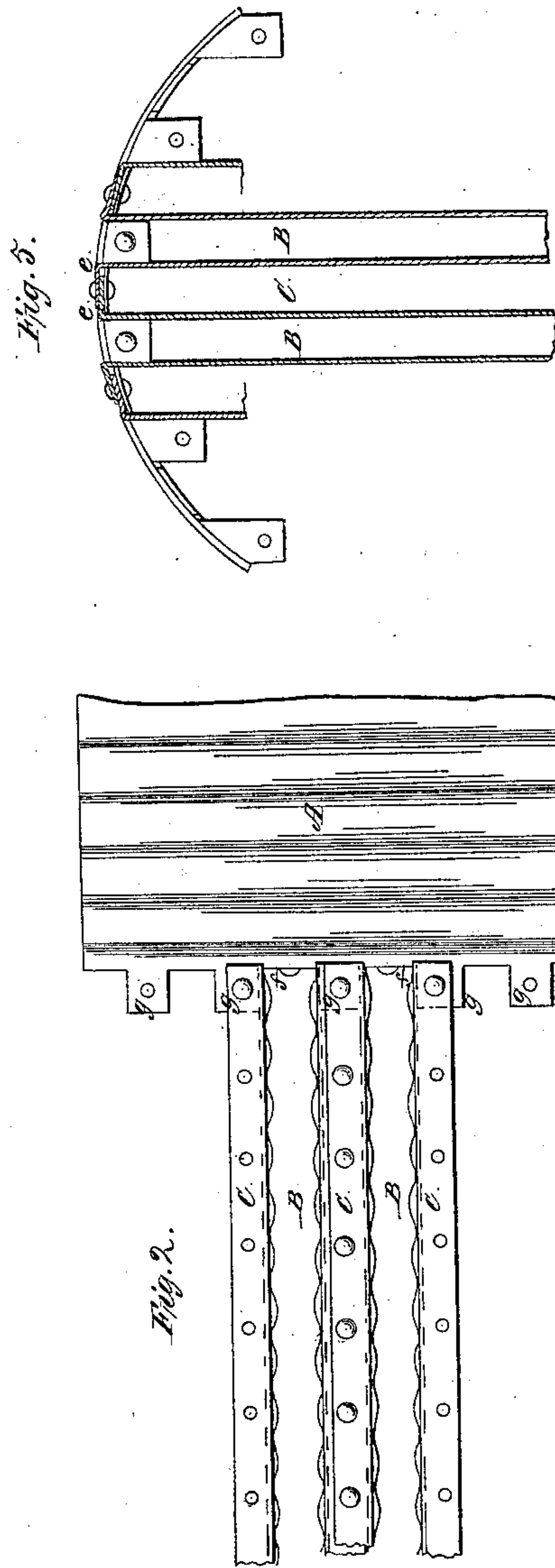
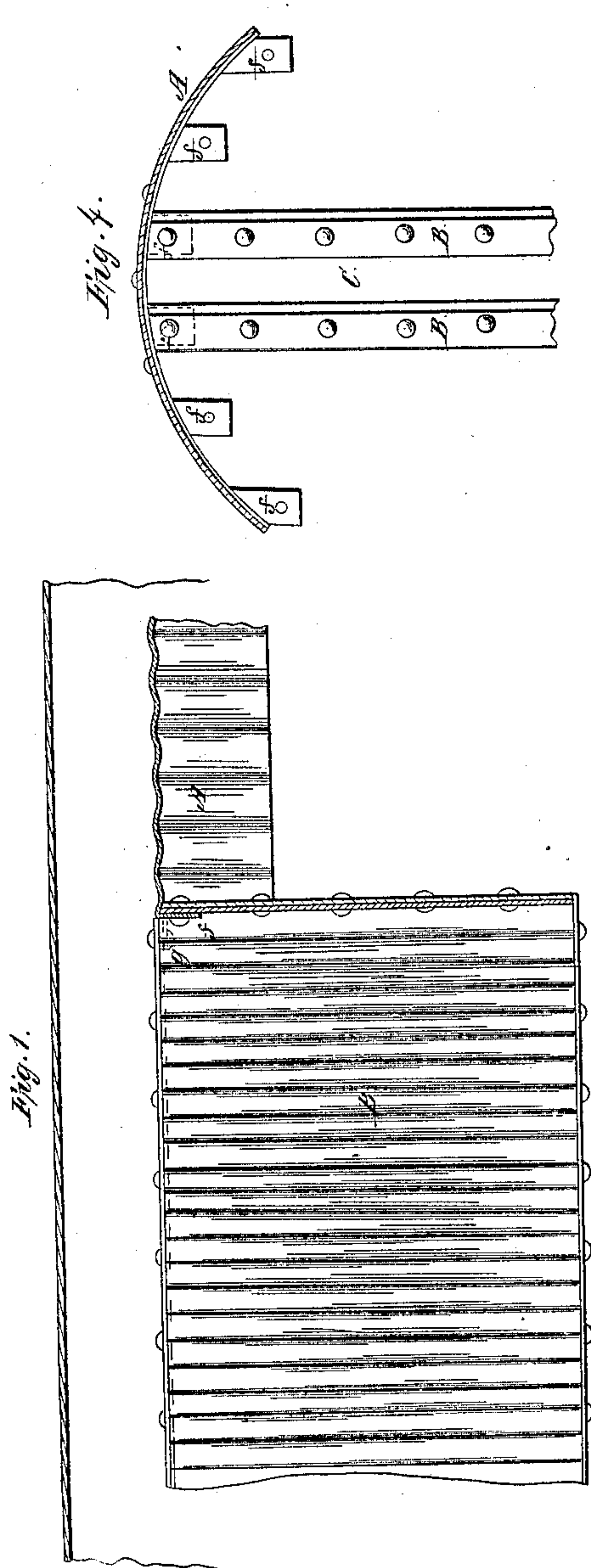


2 Sheets-Sheet 1.

*R. Montgomery,*  
*Steam-Boiler Attachment.*  
*No. 9,538.*      *Patented Jan. 11, 1853.*



2 Sheets-Sheet 2.

R. Montgomery,

Steam-Boiler Attachment.

N<sup>o</sup> 9,538.

Patented Jan. 11, 1853.

Fig. 5.

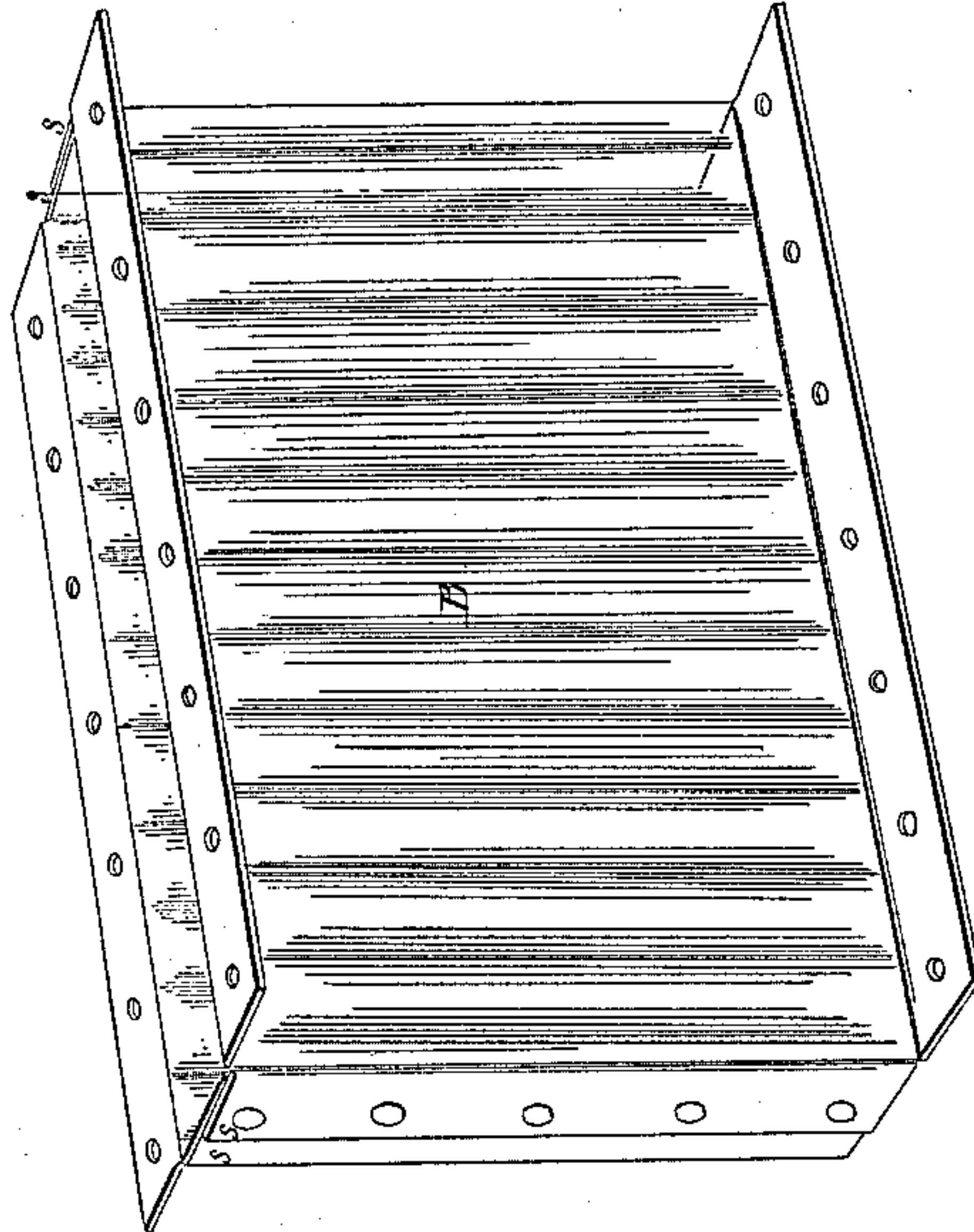
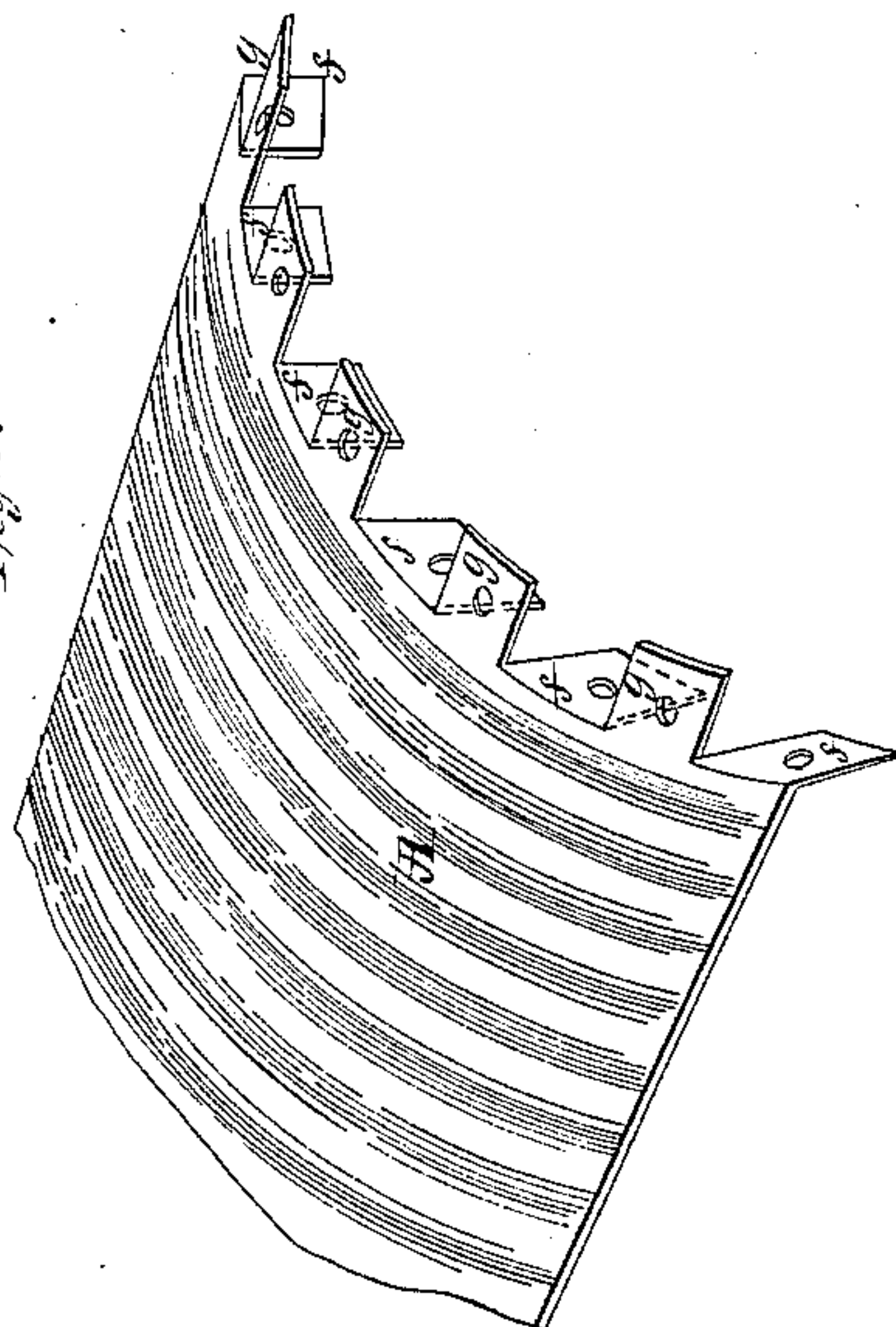


Fig. 6.





# UNITED STATES PATENT OFFICE.

RICHD. MONTGOMERY, OF NEW YORK, N. Y.

## METHOD OF CONNECTING THE SHEETS OF SHEET-FLUE AND WATER-SPACE STEAM-BOILERS.

Specification of Letters Patent No. 9,538, dated January 11, 1853.

*To all whom it may concern:*

Be it known that I, RICHARD MONTGOMERY, of the city, county, and State of New York, have invented certain new and useful  
5 Improvements in Steam-Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of this specification, and in which—

10 Figure 1 represents a vertical, longitudinal section of a fragment of a steam boiler embracing my improvement; Fig. 2, a plan of a portion of the water spaces, flues and fire-box arch of the same; Fig. 3, a vertical  
15 transverse section through the flues and water spaces; Fig. 4, a similar section through the crown sheet of the fire-box, looking in the direction of the water spaces; Fig. 5, a view in perspective of one of the  
20 water spaces, detached; and Fig. 6, a further view in perspective of the crown sheet of the fire-box, detached.

The boiler, to which it is designed to apply my improvements that are represented  
25 in the accompanying drawings, is made of the corrugated plates with flat margins.

A, is the arch of the fire-box; B, B, are the water spaces; and C, C, the flues by which the water spaces are separated, and  
30 which, at their front ends, communicate with the fire-box, and, at their rear ends, with the smoke-box or chimney. The water spaces, B, B, are in this instance, formed of boiler plate whose corrugations run at right  
35 angles to the direction of the flues. These corrugations stiffen the plates sufficiently to obviate the necessity of employing stays to prevent them from bulging under the pressure of the steam. The upper and lower  
40 extremities or margins of the sheets which form the sides of the water spaces are bent outward at right angles, or nearly so, to the sides of the spaces; and, in putting the boiler together, the flanges, thus formed,  
45 are overlapped (as shown at *e e*) to make the tops and bottoms of the flues. The extremities of the forward and rear edges of the plates of the water spaces are similarly bent, but so as to project in an opposite direction,  
50 and the flanges, thus constituted, are also overlapped, (as shown at *s s*), to form closed ends to the water spaces, or faces and backs thereto. When such a series of flues and water spaces are to be connected with the  
55 arch or roof of the fire-box, the rear margin of the latter is to be slit at right angles to its edge so as to form a series of tongues

(*f, g*), which correspond in width with the adjacent water spaces and flues; the tongues (*f*), corresponding in width with the water  
60 spaces, are bent at right angles to the plane of the roof, so as to extend downward a short distance against the ends of the water spaces; the other alternate tongues (*g*) are not bent, but project under the tops of the  
65 flues, which, as before stated, are formed by the overlapping top and bottom flanges of the sides of the water spaces. The whole is then secured by rivets, as represented, and calked in the usual manner. 70

The boiler plate of which such a boiler is constructed, may be either corrugated longitudinally or transversely, or may be a plain sheet suitably stayed wherever necessary. The method I have described of connecting the series of flues and water spaces with the roof of the fire-box, may be employed with advantage in connecting their opposite extremities with the smoke-box or with the uptake, and forms a simple and  
80 substantial mode of uniting those parts. The formation of the flues and water spaces, by overlapping the edges of the plates which form the sides of the water spaces, not only dispenses with the usual flue sheet but involves an economy in the construction of  
85 this form of boiler by a reduction of material and labor in putting the parts together, also lessens the number of joints between the water spaces and the flues. 90

Having thus described my improvements in steam boilers, what I claim as new, and desire to secure by Letters Patent, is—

1. Riveting together the overlapping flanges of the opposite sides of sheet flues in  
95 steam boilers in the manner described, whereby the flues are firmly attached each to each and the usual flue sheet is dispensed with, and also certain advantages in construction attained in other parts of the  
100 boiler, as described.

2. I also claim the method of connecting a series of flues and water spaces with the roof or arch of the fire-box, by means of tongues which project from the latter and  
105 are secured alternately to the faces of the water spaces and to the tops of the flues.

In testimony whereof I have hereunto subscribed my name.

R. MONTGOMERY.

Witnesses:

P. H. WATSON,  
C. C. HANNAY.