Sheet 1. 2 Sheets.

J. Montgomery.

Bridge Girder.

No. 83,196. Patented Oct. 20, 1868.

Fig: 1

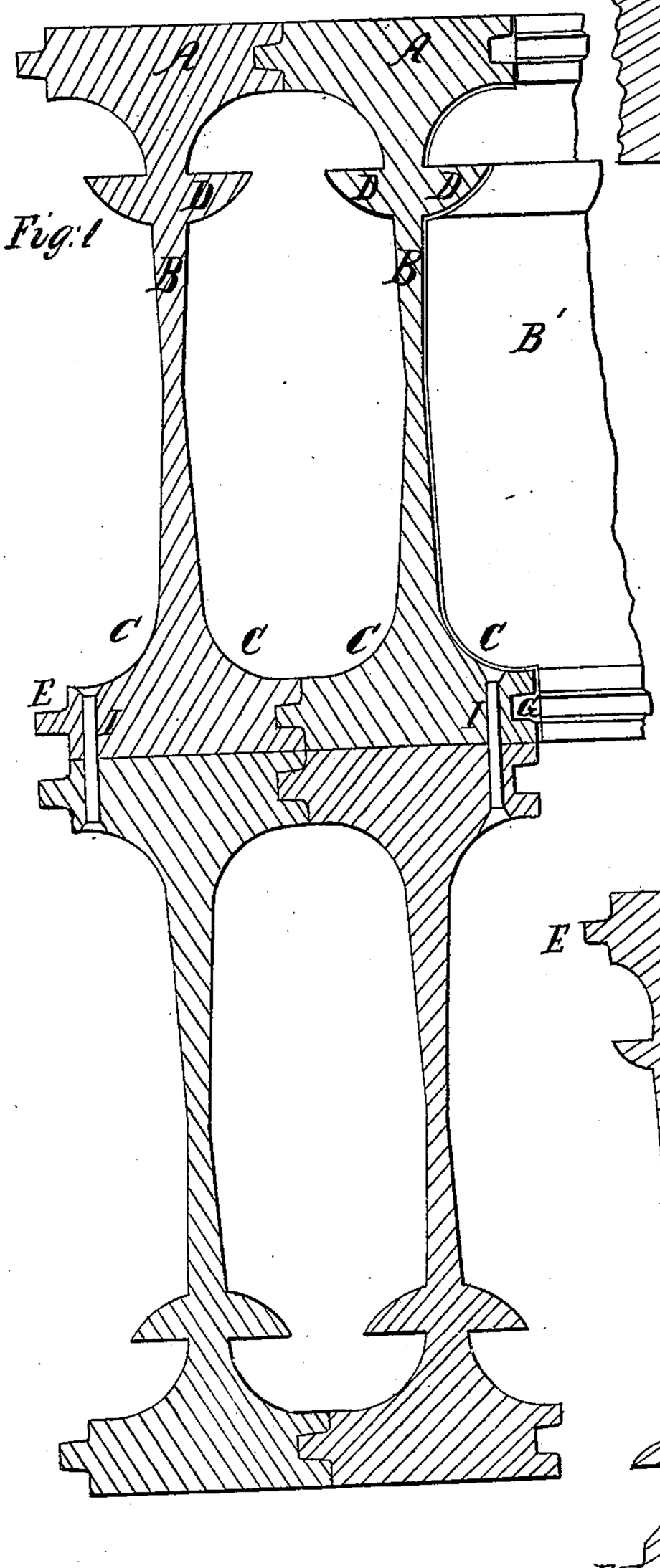


Fig: 2

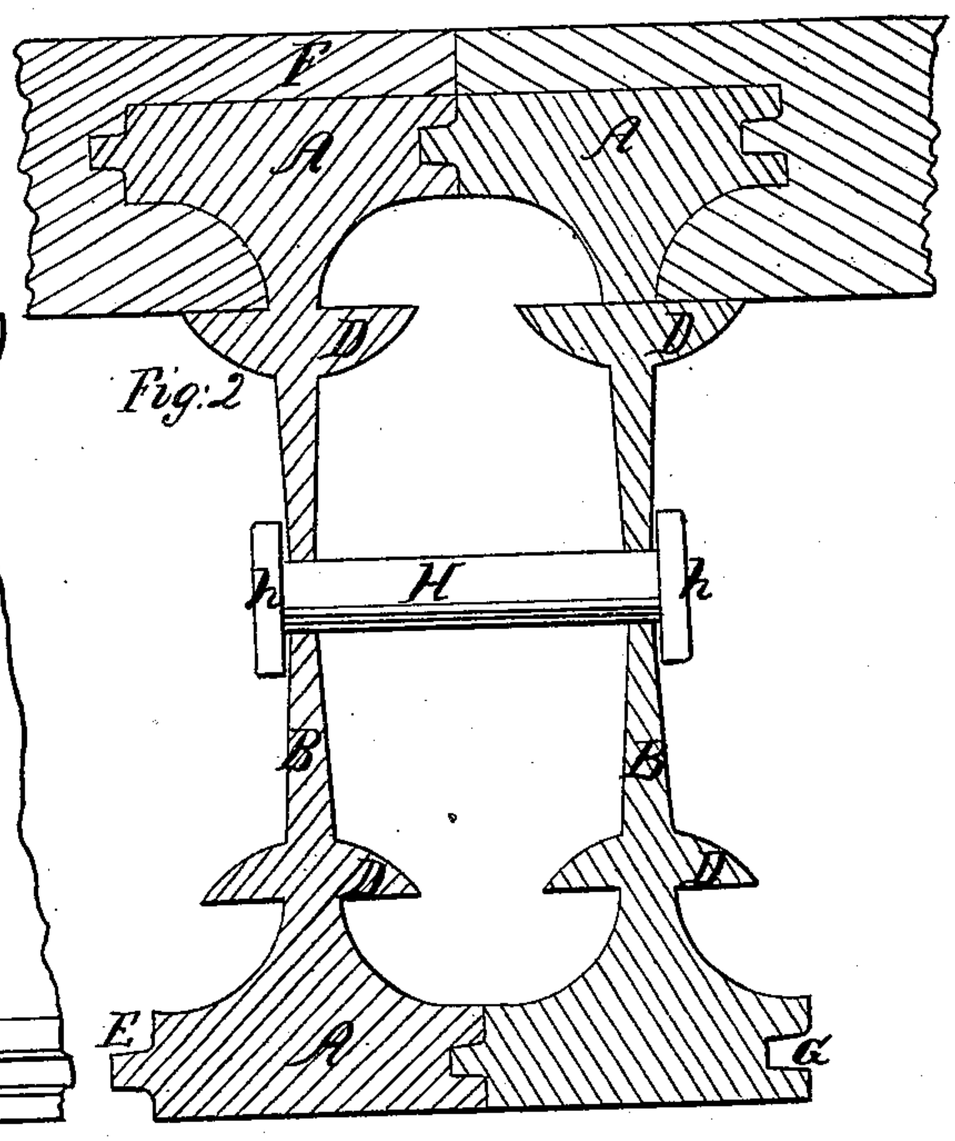
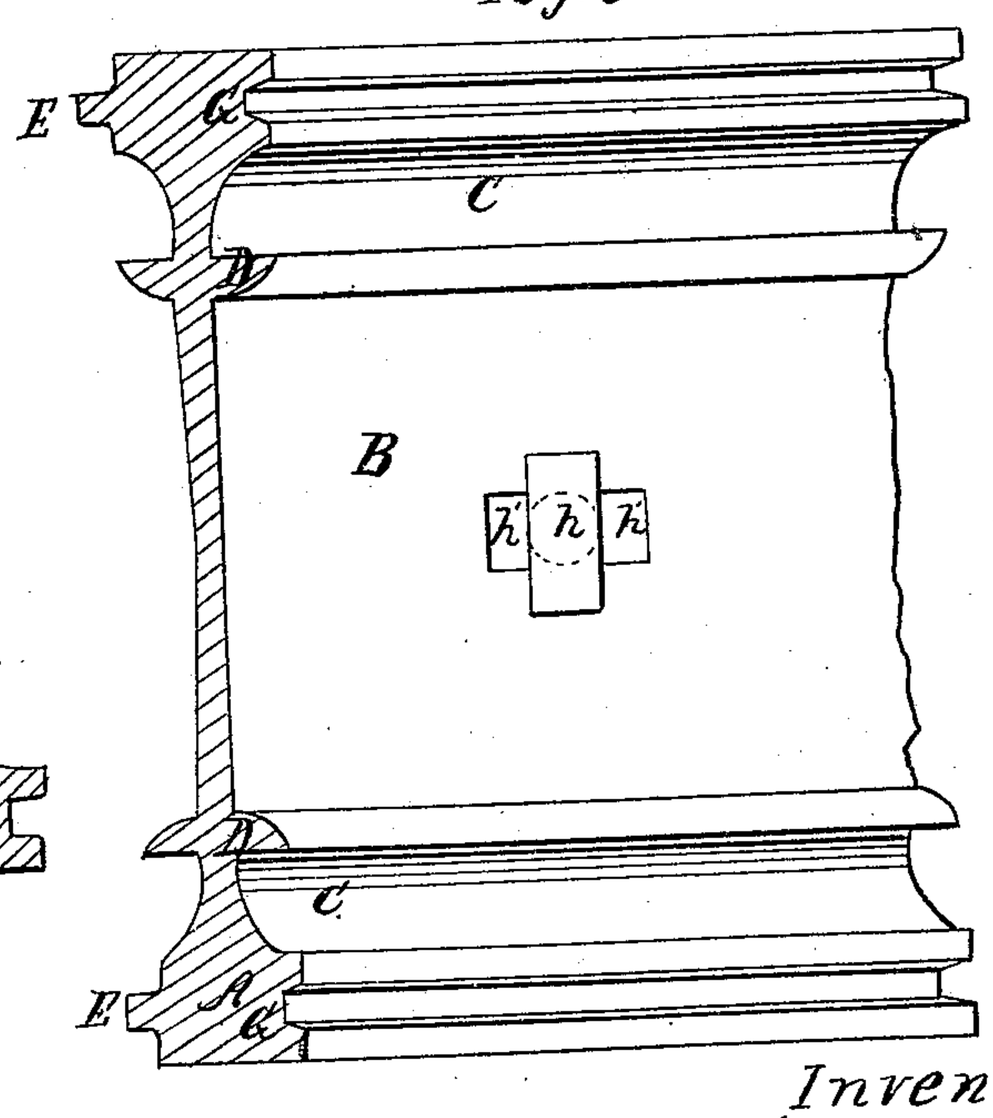


Fig: 3



Witnesses.
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W. C. Brereton

Inventor
James Montgomery

Sheet 2. 2 Sheets.

J. Montgomery.

Bridge Girder.

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Fig: 4

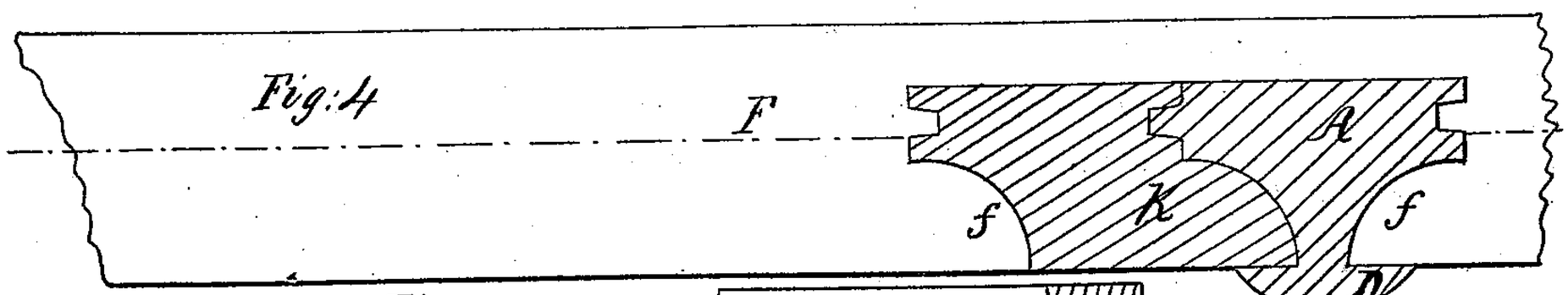

Fig: 6

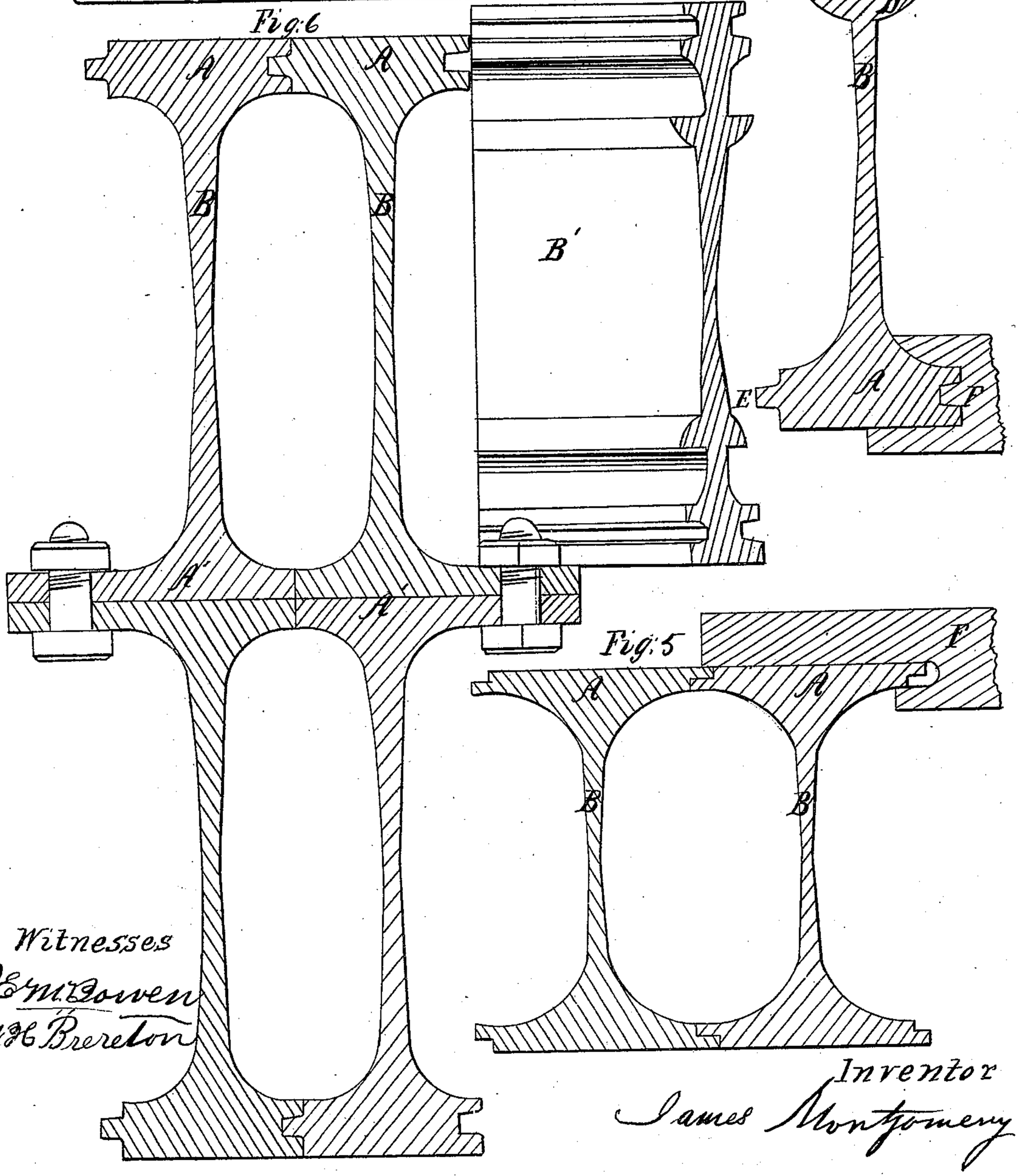

Fig: 5

Witnesses

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JAMES MONTGOMERY, OF CROTON LANDING, NEW YORK.

Letters Patent No. 83,196, *dated October* 20, 1868; *antedated October* 10, 1868.

IMPROVED BEAM AND GIRDER.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JAMES MONTGOMERY, of Croton Landing, in the county of Westchester, and State of New York, have invented a new and useful Improvement in Beams and Girders, and in flooring to be used therewith; 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, which are part of this specification.

Figure 1 represents a transverse section of a compound girder illustrating my invention.

Figure 2 is a transverse section of a pair of joist-beams with flooring applied.

Figure 3 is a side view of a portion of one of the beams shown in fig. 2.

Figure 4 is a transverse section of a joist, illustrating a mode of keying flooring thereto.

Figure 5 is a transverse section illustrating a modification in the manner of jointing together or assembling the beams.

Figure 6 is a transverse section of a girder, showing the end of a joist or beam applied thereto.

The objects of my invention are—

First, to so construct iron or steel beams and girders, that the principal weight of metal will be located in points where the chief tensile and compressive forces will be sustained.

Second, to provide convenient means for assembling two or more beams or girders, in such a manner that they will mutually support each other.

Third, to provide means whereby flooring may be secured to beams without nails or bolts.

In the drawings, A A represent the heads or flanges of my improved beam, and B the web, which tapers in thickness from each head or flange toward the centre, and is connected to the heads by curved shoulders C C. By this specific form, I apply the greatest thickness of metal in parts where the chief tensile and crushing strains are sustained, and thus produce a beam which will afford the greatest possible strength with a given weight of material.

D D represent ribs or flanges for supporting the under surface of the flooring F, as shown in figs. 2 and 4.

E and G are respectively tongues and grooves formed upon the edge of the heads or flanges A, to adapt the beams to mutually support each other when they are assembled together, as illustrated in figs. 1, 2, and 4.

Each beam constituted of the parts A A, B, C C, D D, E, and G, I propose to roll in one piece of iron or steel, by means of suitable machinery.

Where additional strength is required, any number of beams may be placed side by side, in the manner illustrated in fig. 2, and secured by bolts H passing through their webs B, from one side to another of the series, or two, four, or more beams may be placed one above another, as illustrated in fig. 1, and secured by vertical bolts I. A cluster of four, or even two beams, assembled in this manner, will constitute a girder of great strength in proportion to its weight.

Fig. 3 illustrates my mode of applying the connecting-bolts H. Said bolts being made of the required length, with two solid heads *h h*, of oblong form, are passed through horizontal slots *h'*, of such size and shape as just to admit the heads, and the bolt being then turned one-quarter round, so as to bring its heads *h* at right angles to the slots *h'*, the bolt will be firmly held in place, and by reason of the extremities of the bolt-heads being made to rise up on thicker portions of the webs, will wedge or compress the beams together with great force.

For securing flooring to the beams without bolts, nails, or rivets, I form, on the under surface of the planks F, recesses of proper size to pass over the beam-heads, and having moulded faces *f f'*, which may be formed by a rotary cutter to adapt the planks to fit against one edge and shoulder of the head.

K represents a key formed to fit on one side or face *f'* of the recess, and on the other, the opposite edge and shoulder of the beam-head. As each plank is placed over the beams, it is slipped endwise until the moulded face *f* is brought home against the side of the head, and the key K is then driven in to secure it.

In fig. 5, is shown a slight modification in the mode of forming the tongues and grooves to connect the beams, one half of each tongue being formed on the upper, and the other half on the lower flange of the beam, and so of the grooves, to adapt the beams to fit together.

Lighter flooring may be secured by engaging under the edge of the beam-head, as shown in fig. 5, or engaging in the groove only, as illustrated by red lines in fig. 4.

Fig. 6 illustrates a modification in the construction of the compound girders, the central flanges being extended horizontally to receive and support the cross-beams B'.

In practice, however, I prefer to form the ends of said cross-beam B', by means of suitable machinery, so as to adapt them to fit within the irregular-curve side of the girder, as illustrated in fig. 1, so that any lateral extension of the central flanges beyond the width shown in fig. 1 may be unnecessary.

My improvements in beams and flooring are applicable to marine as well as land architecture.

The compound beams may be made to form tubes for the conduction of hot air, gas, water, or for domestic purposes, and it is my intention so to use them.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. A beam or girder, formed with heads A A, con-
cted, by converging shoulders C C, to a web, B,
nich tapers from both heads towards its mid-with or
ansverse centre, substantially as and for the purpose
plained.

2. I further claim, jointing together two or more of
y improved beams, in substantially the manner herein
scribed, so as to make them mutually support each
her.

3. I also claim the flanges D, for supporting the flooring F, in the manner specified.

4. In combination with a beam or girder, constructed as set forth in the first clause, I claim the bolt or key H *h*, applied and operating as explained

JAMES MONTGOMERY.

Witnesses:

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W. H. BRERETON.