(No Model.) 2 Sheets—Sheet 1.

E. MOLLOY.

TIMBER ROOF STRUCTURE.

No. 460,981. Patented Oct. 13, 1891

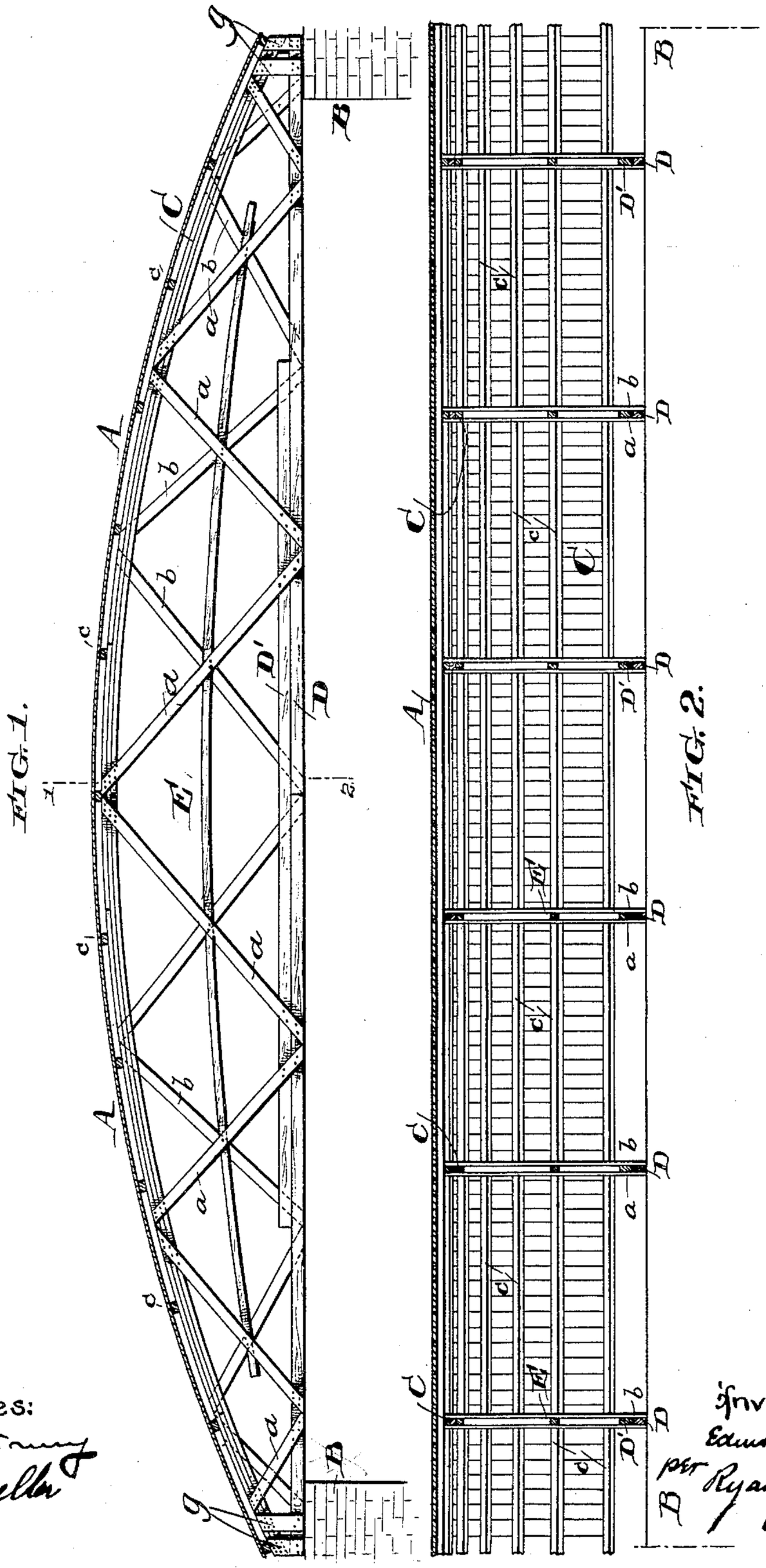

FIG. 1.

FIG. 2.

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(No Model.) 2 Sheets—Sheet 2.

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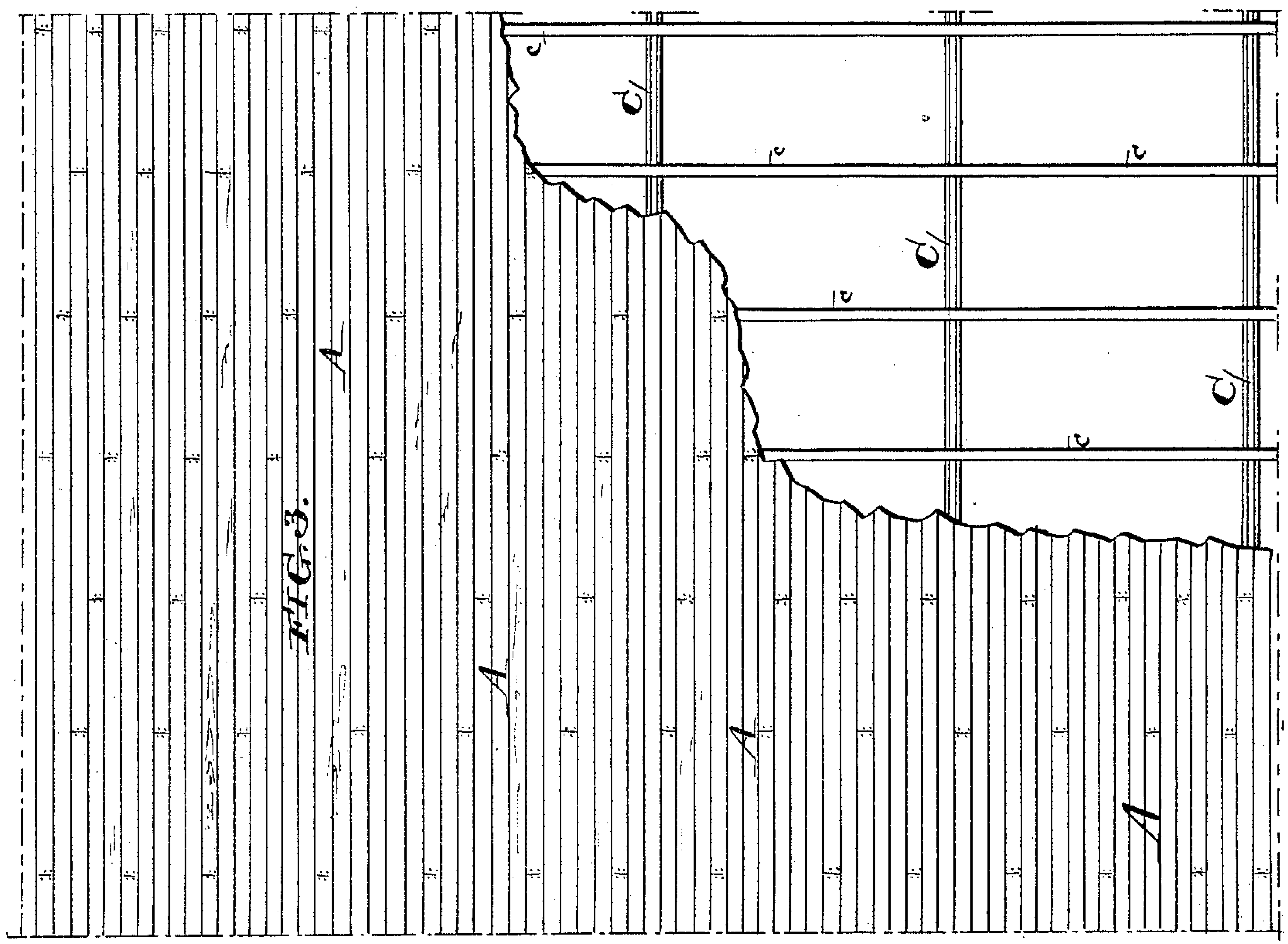

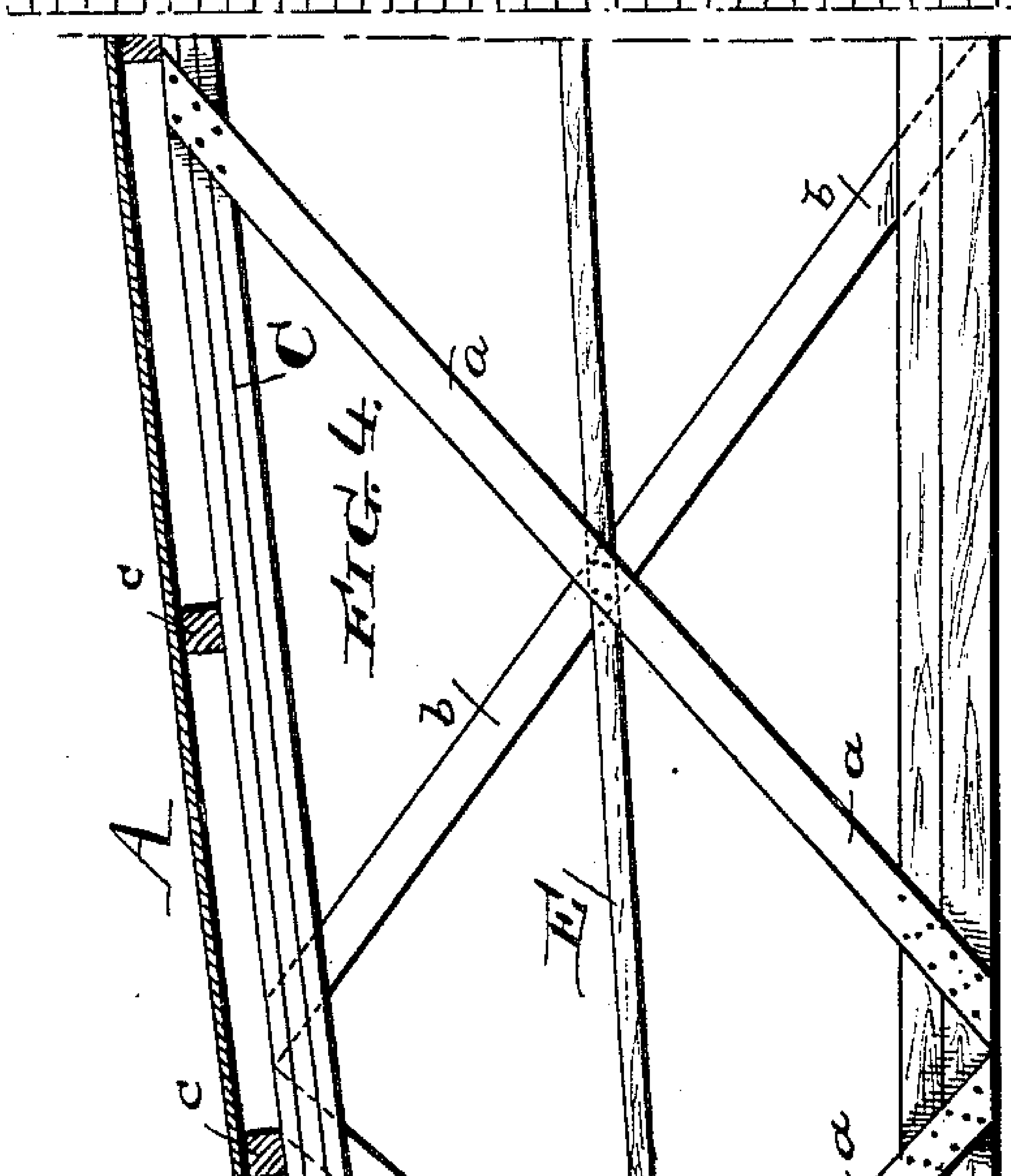

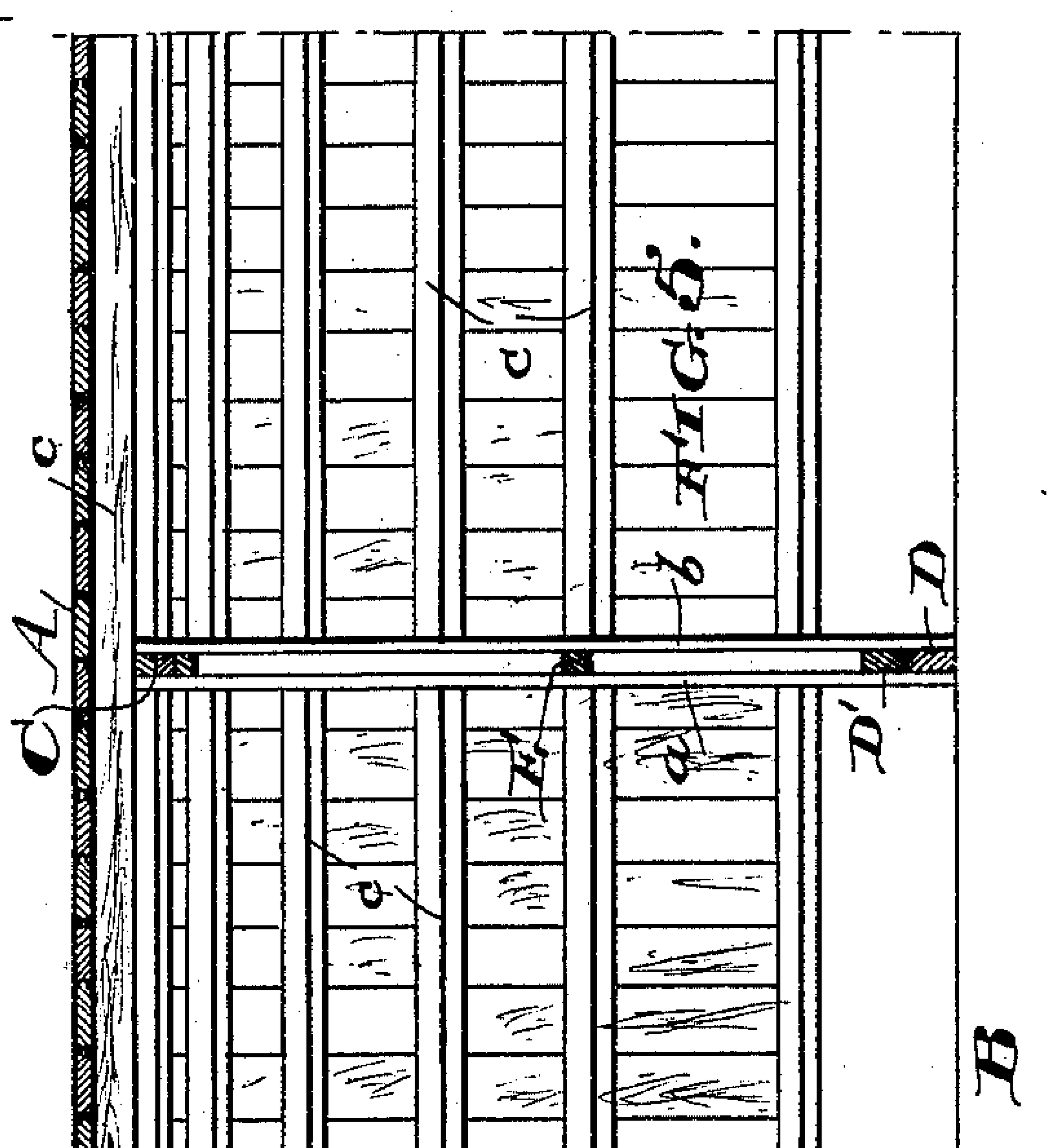

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UNITED STATES PATENT OFFICE.

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TIMBER-ROOF STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 460,981, dated October 13, 1891.

Application filed March 3, 1891. Serial No. 383,788. (No model.)

To all whom it may concern:

Be it known that I, EDMOND MOLLOY, a citizen of the United States, residing in the city of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Timber-Roof Structures, of which the following is a clear and sufficient specification, reference being had to the drawings annexed to and forming a part of this specification.

In timber-roof structures heretofore the supporting of the roof has generally been done by trusses or braces, very little, if any, of the strain being intended to be upheld by the cover or roof proper itself. In this way many weighty and cumbrous truss structures intended to support the weight of the roof have been employed, whereby the weight of the whole structure has been increased without any proportional increase in the strength of the roof.

In my device the main strength of the structure is given by the spring of the boards forming the roof-sheath themselves, which are so secured that they form together bent a practically homogeneous structure, which is bent into the form of a bow, and I use the trusses chiefly, or frequently entirely, to give rigidity to this covering structure. I can make these trusses for this purpose of an extremely light weight and can place them at much greater distance from each other than could be done were they used for the purpose of supports of the roof and for the maintenance of the weight of the roof structure. The use of the bow springing timber cover of the roof and the rigidity-giving truss are, then, the essentials of my invention, the mechanical structure and the details whereof are described in the following part of the specification, and shown in the drawings, in which—

Figure 1 is a cross-section across the arch. Figure 2 is a longitudinal section through the highest portion of the arch on the line 1 2 of Fig. 1. Fig. 3 is a plan view of the covering of the roof, a portion of the boarding having been broken away to show the structure beneath. Fig. 4 is an enlarged view of a portion of the structure shown in Fig. 1, and Fig. 5 an enlarged section of a portion of the structure as shown in Fig. 2.

The drawings of this application are drawn as far as possible to the scale of an operative structure, the size of the purlins and thickness of the boards excepted, but are intended only to show the extreme lightness with which the structure can be constructed, and are not, of course, to be taken as limiting the device to the proportional sizes of material illustrated.

In practice I find the best way to construct my roof structure is to construct the trusses, and after the wall or other support B on which the sides of the roof are upheld are up to place these trusses thereon. I find these trusses are most advantageously constructed of a bow portion C and a stringer D. As the main purpose of the bow portion is to give rigidity to the roof-cover, I preferably make the width very slight and the height proportionately much greater. A convenient construction by which this is accomplished is that shown in the figures. Employing three pieces placed one above the other and bent into a bow form in any convenient or customary manner, in order to show the extreme lightness with which such truss can be constructed but not to limit my invention, I would say that where this preferred form of bow-piece is used the three pieces composing it need not be over two by two each to give the rigidity where the span of the arch is forty feet and the trusses are eight feet apart. The joints of the pieces composing the bow C can be broken in various places. For the same object I prefer to construct the stringer D with the widest part in the direction of the height of the truss, and when the stringer is composed of two pieces I generally secure them together by placing scarfing-piece D′ on top of the same, which I preferably arrange to give its greater width in the direction of the height of the truss.

To assist in giving rigidity to the truss, I generally connect the bow-piece and the stringer by means of braces, which are preferably the diagonals *a a b b*. For convenience the diagonals *a a a*, &c., are generally placed on one side of the bow-piece and stringer and the pieces *b b b b*, &c., on the other side of the same. Between these diagonal braces, to give greater rigidity to the structure, I generally place a curved piece E. This piece also is most advantageously made with the greate-

width in the direction of the height of the truss. I generally need only extend this piece through the center portion of the truss, where a greater flexibility of the diagonals would naturally be, and I find the best place to connect it to the diagonals is where the direction of two of them intersect. I secure the ends of the bow-piece to the stringer in any convenient manner. They can be secured to each other by boards *g g*, nailed to each, as is shown in the drawings.

I prefer to construct the trusses on the ground and to mount them afterward, which, on account of their extreme lightness, can be readily done, with ends on the supporting sides B B of the building. On the top of these trusses I place the covering-timbers, which, on account of the arched form of the roof, the elasticity of the timbers forming the roof-covering, and the homogeneousness into which they are wrought, are practically self-supporting and place the weight of the covering almost entirely directly on the walls B B.

I find that the roof-cover is constructed most advantageously of boards (which are ordinarily scant inch boards) running substantially in the direction of the length of the trusses; but I do not limit myself to boards thus running, as any direction in which the spring of the board and its lengthwise strength can be utilized to maintain the arch will be within my invention. I connect these boards into a homogeneous structure by securing them at suitable intervals to pieces running at angles with them, and where the span of the arch is too great for a single length of timber to be used I break the joints of the boards at various ones of these cross-pieces, as is illustrated in Fig. 3.

In practice I find the most advantageous manner of constructing my invented roof is, after the trusses or several of them are placed in position, to fasten purlins *c c c c*, extending across them at suitable distances apart. On these purlins, after they have been placed in position, are secured the boards arranged to run at an angle with them, taking care to break the joints of neighboring boards at different purlins. I preferably arrange these purlins to run longitudinally with respect to the arch, as shown in the drawings, and most advantageously run the boards directly from the edge of the roof in the direction of the highest part of the arch and nail them fast in the ordinary manner used for boarding curved surfaces, taking care, however, that their natural elasticity is not impaired.

In my construction it can be seen that the strain caused by the effort to flatten itself of the elastic homogeneously-connected-together bent roof-sheath is expended in producing (analogously to the strain upon the string of a strung bow) a stretching strain upon the stringer D, which will be rendered more rigid by the strain. This strain may be taken directly from the roof-sheath at the lower part of the arch or be transferred in part at the various purlins to the piece C of each truss. The strain, however, upon the piece C will be a straightening strain and not a horizontal or breaking one, and the whole or nearly the whole of the weight of the roof-sheath will be sustained, without substantial horizontal pressure upon the pieces C, directly from the sides B B. The sheath is practically self-supporting independently of the trusses. When, however, an unequal pressure is brought to bear upon any part of the roof-sheath, the tendency of an elastic sheath which is supported at its sides only would be to be depressed at the point of pressure and to belly out at another point. To guard against such a defect, the rigidity needful is given by the trusses, which, as has been before stated, are constructed in such manner, before described, as will best resist a pressure brought to bear upon and tending to depress a single point of the sheath, and are not constructed to sustain the weight of the roof-sheath.

When the boards have been secured to the purlins, the roof may be treated in the same manner as roofs constructed in any manner by tinning, graveling, or otherwise.

While I have described with great minuteness and in particular my invented roof, even in some cases going into the details of the sizes of some of the timbers therein, I do not limit myself to the precise structure shown and described, as many changes can be made therein without departing from my invention.

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

1. The combination of a homogeneous arched timber-roof sheathing having the timbers forming the same connected together into a homogenous sheet, arched trusses in which the bow-piece is in the form substantially of an arc of a circle and which are provided with rigid stringer-pieces, and connections uniting the said sheathing to the trusses, and supports on which said trusses are supported, substantially as described.

2. The combination of a homogeneous arched timber-roof sheathing, consisting of a series of boards running substantially in the direction of the circumference of the arch of the roof and secured to purlins running substantially at right angles with said boards, arched trusses in which the bow-piece is bent into the form substantially of an arc of a circle and which is provided with a rigid stringer-piece, connections uniting the said sheathing to the trusses, and supports maintaining the structure, substantially as described.

3. The combination, with a homogeneously-connected arched roof-sheathing having the timbers forming the same connected together into a homogeneous sheet, of arched trusses consisting of a compound arch-piece formed of several pieces one above the other, a straight timber stringer-piece having its greatest width vertical, and diagonal connecting-pieces connecting the bow-piece and the stringer, substantially as described.

4. The combination, with a homogeneous arched timber-roof sheathing having the timbers forming the same connected together into a homogeneous sheet, of arched trusses consisting of a compound arch-piece formed of several pieces placed vertically above each other, a straight timber stringer having its greater width vertically, and diagonal connecting-pieces having their greater width vertically and placed alternately on opposite sides of the bow-piece and stringer, connections uniting the sheathing and the trusses, and supporting-walls, substantially as described.

5. The combination, in a timber truss for timber roofs, of a compound arch-piece consisting of several pieces placed vertically above each other, a straight horizontal stringer, diagonals having their greatest width vertical and crossing on one side and the other of the stringer and arch-piece, and a supplemental piece E, substantially as described.

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Witnesses:
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