

(No Model.)

2 Sheets—Sheet 1.

J. W. KENSETT.
METALLIC FIRE PROOF STRUCTURE.

No. 417,250.

Patented Dec. 17, 1889.

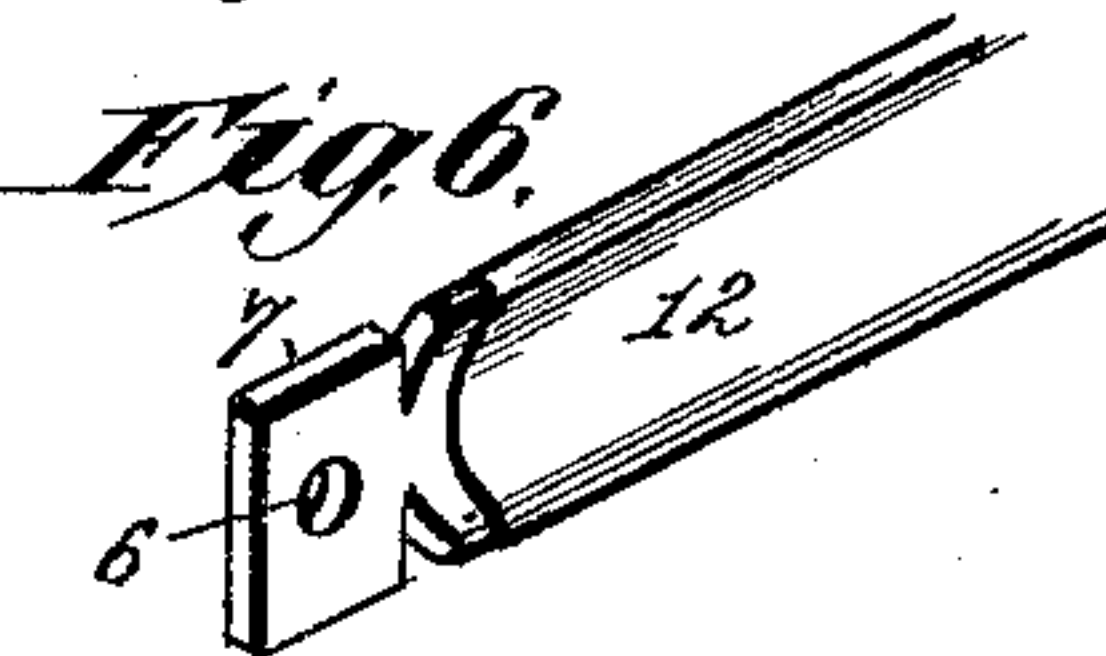
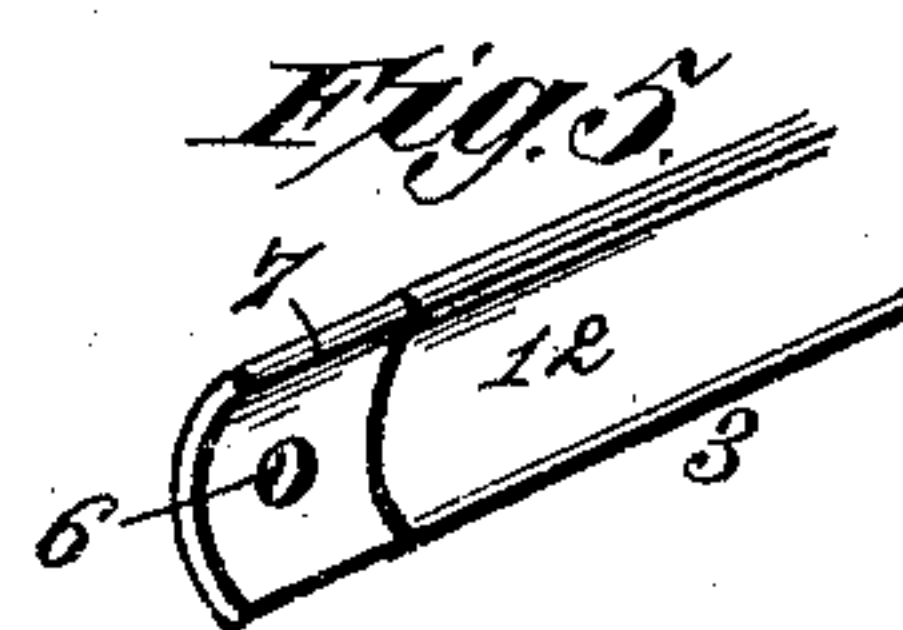
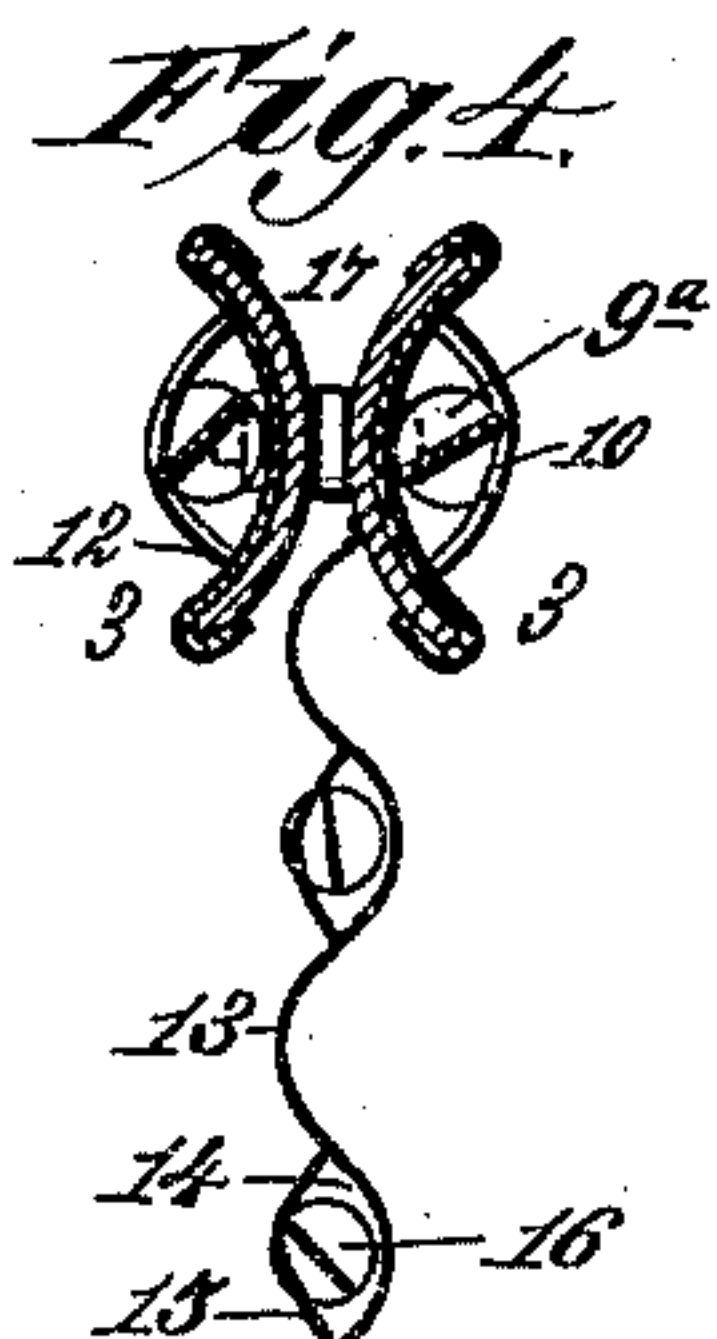
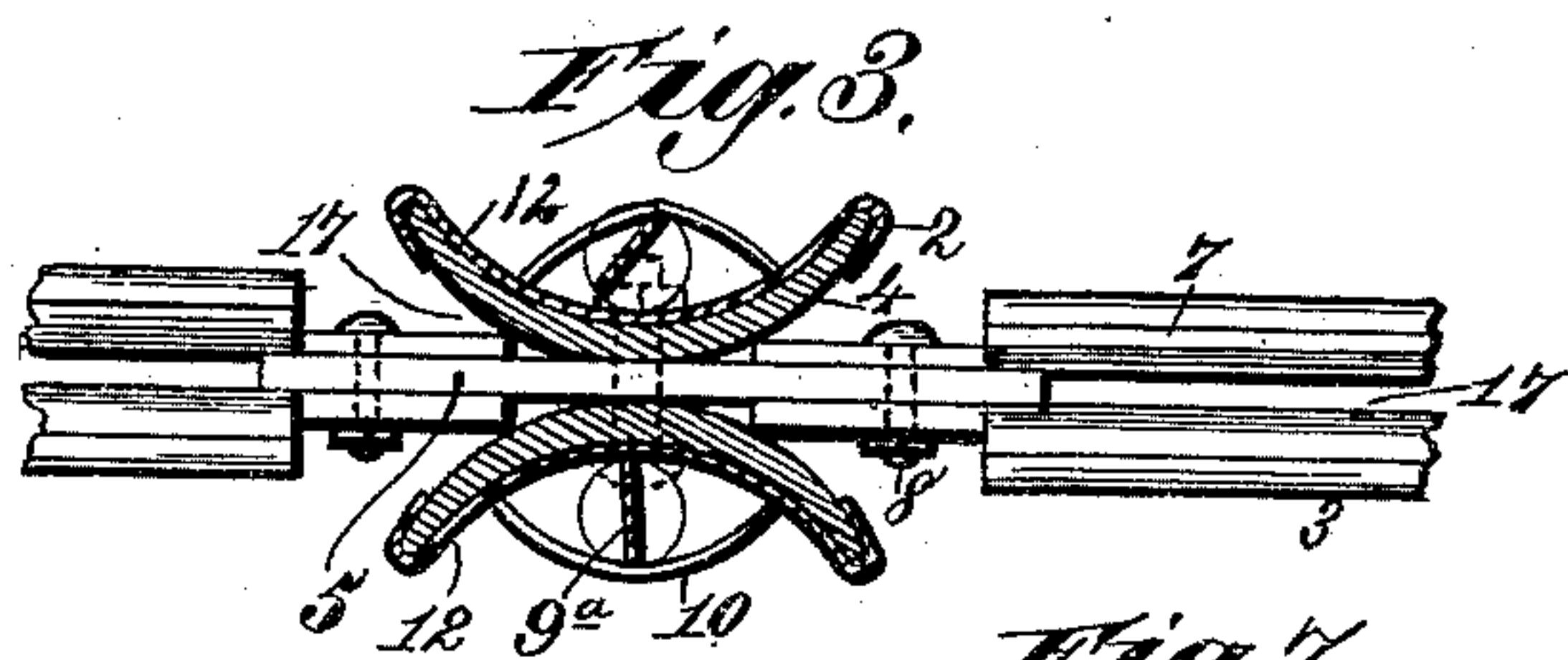
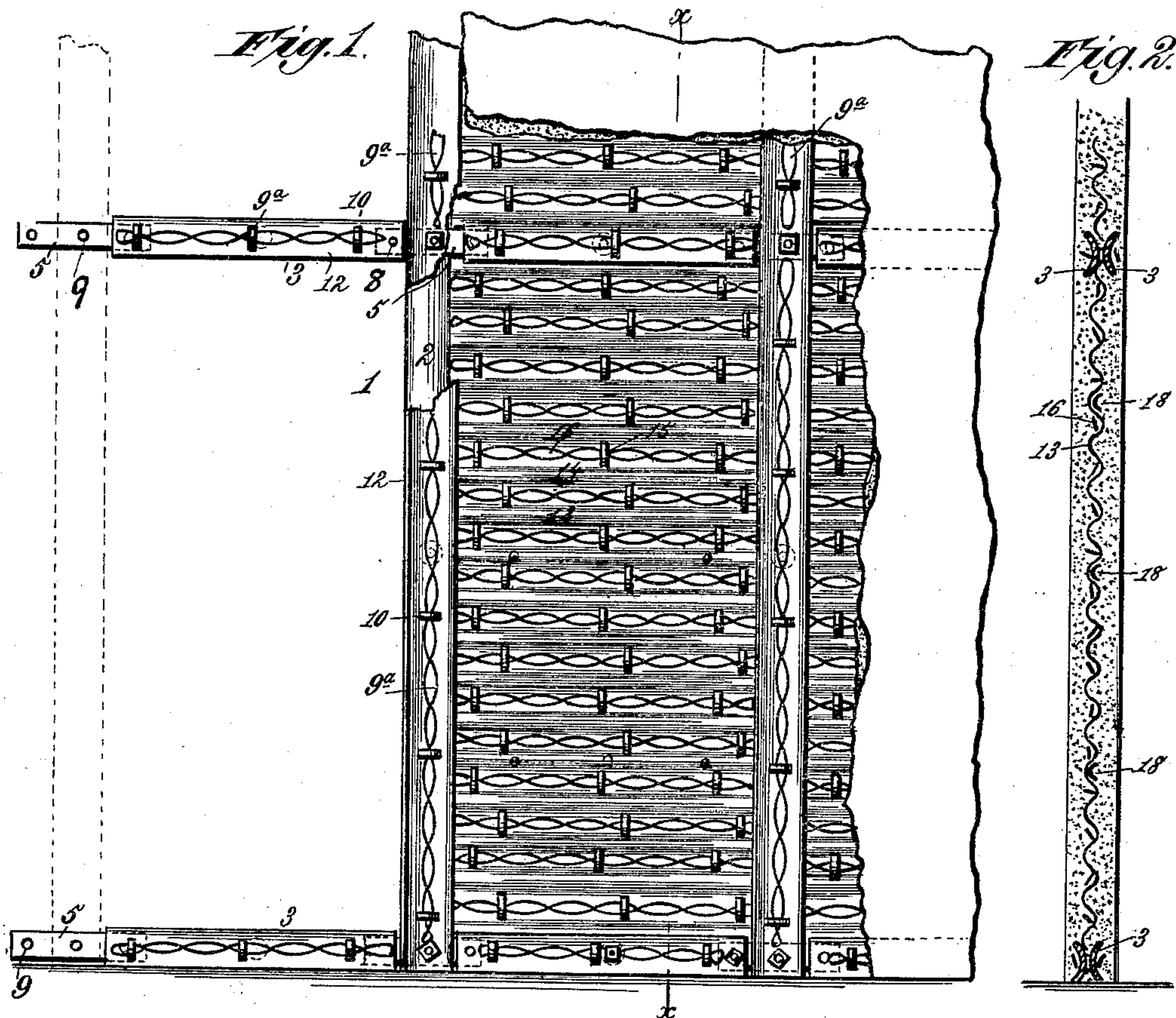
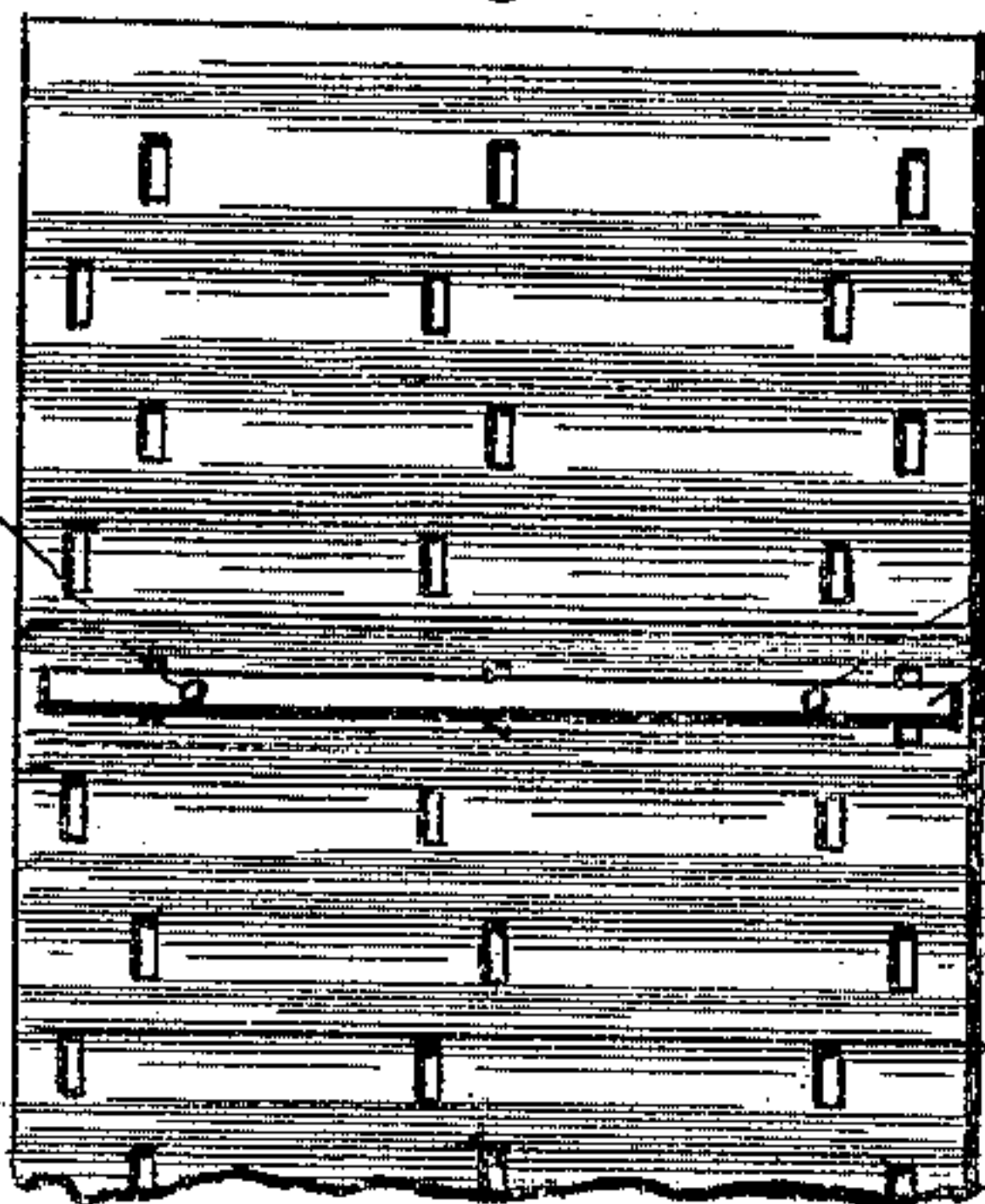


Fig. 7.



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Robert Everett,
Dennis Sumbly.

Inventor:
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By
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 8.

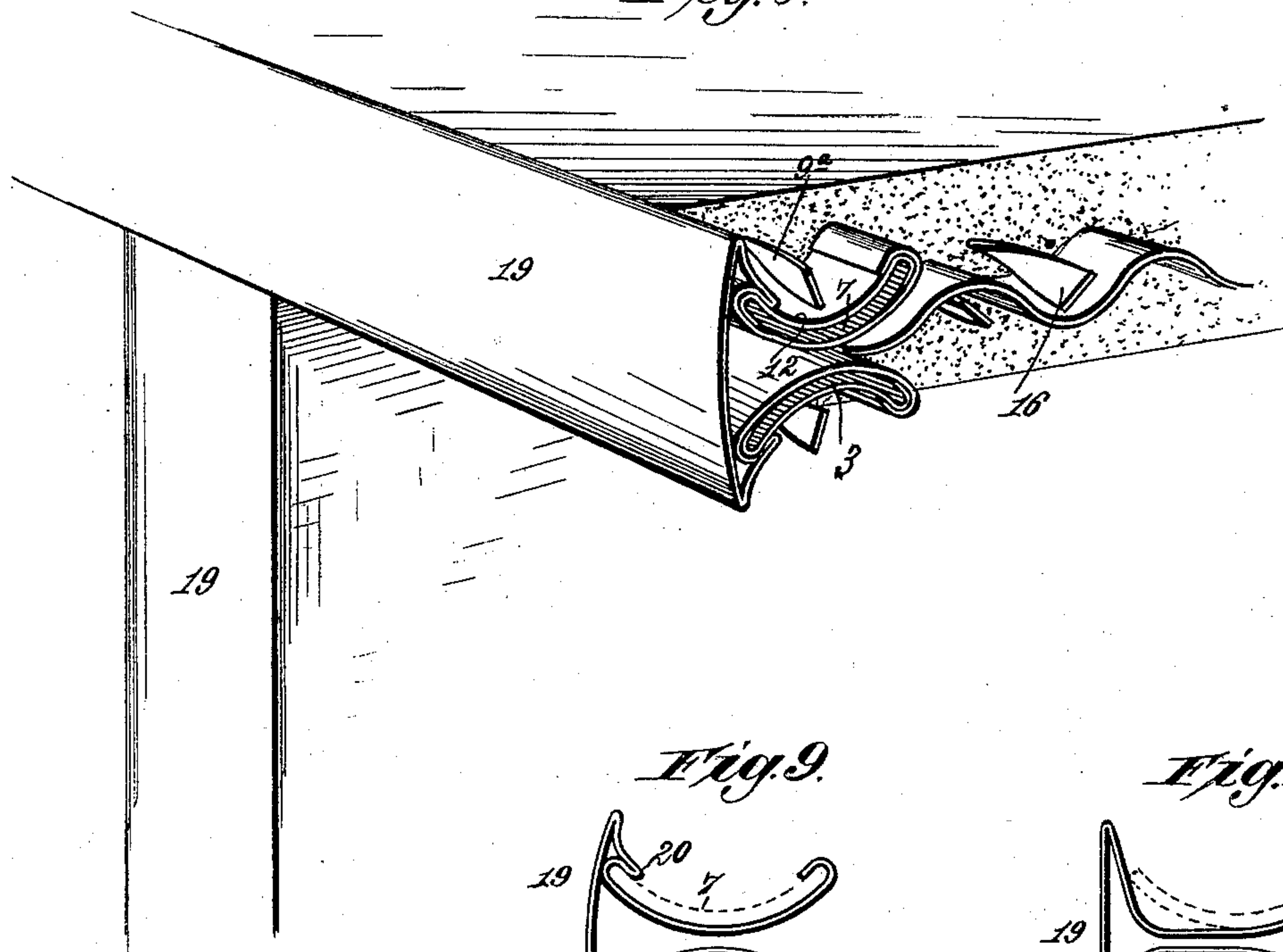


Fig. 9.

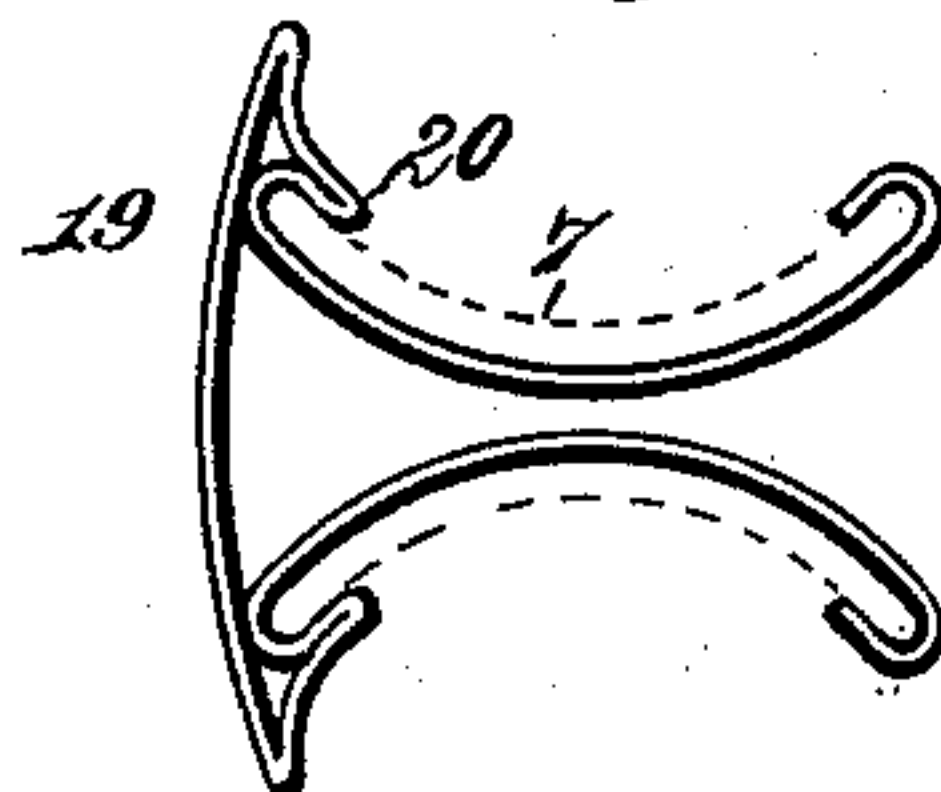


Fig. 10.

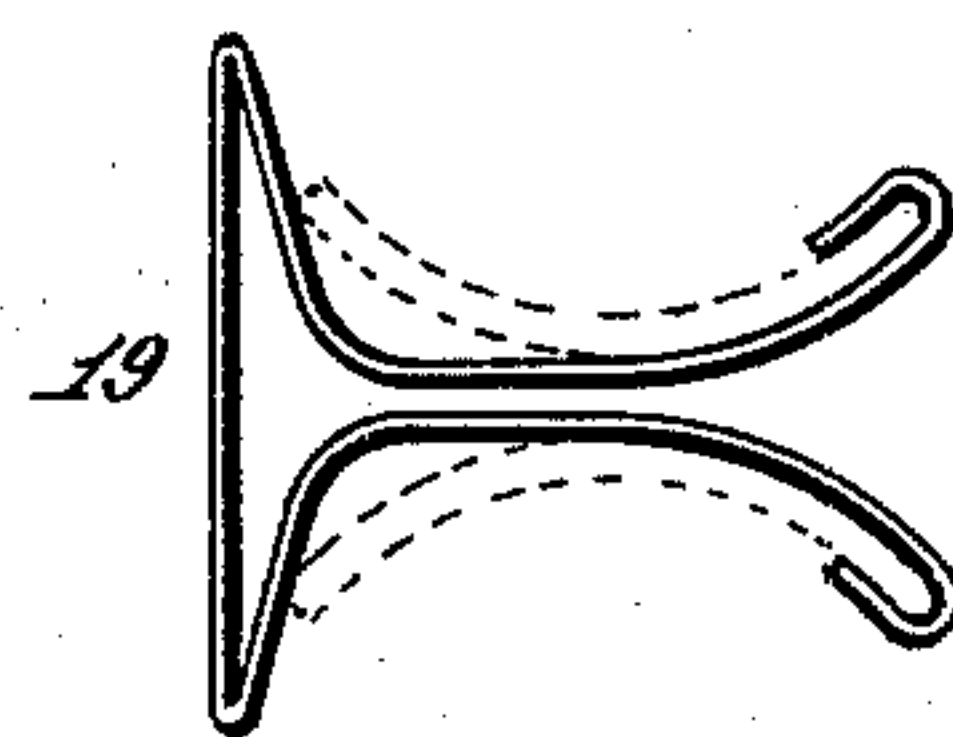
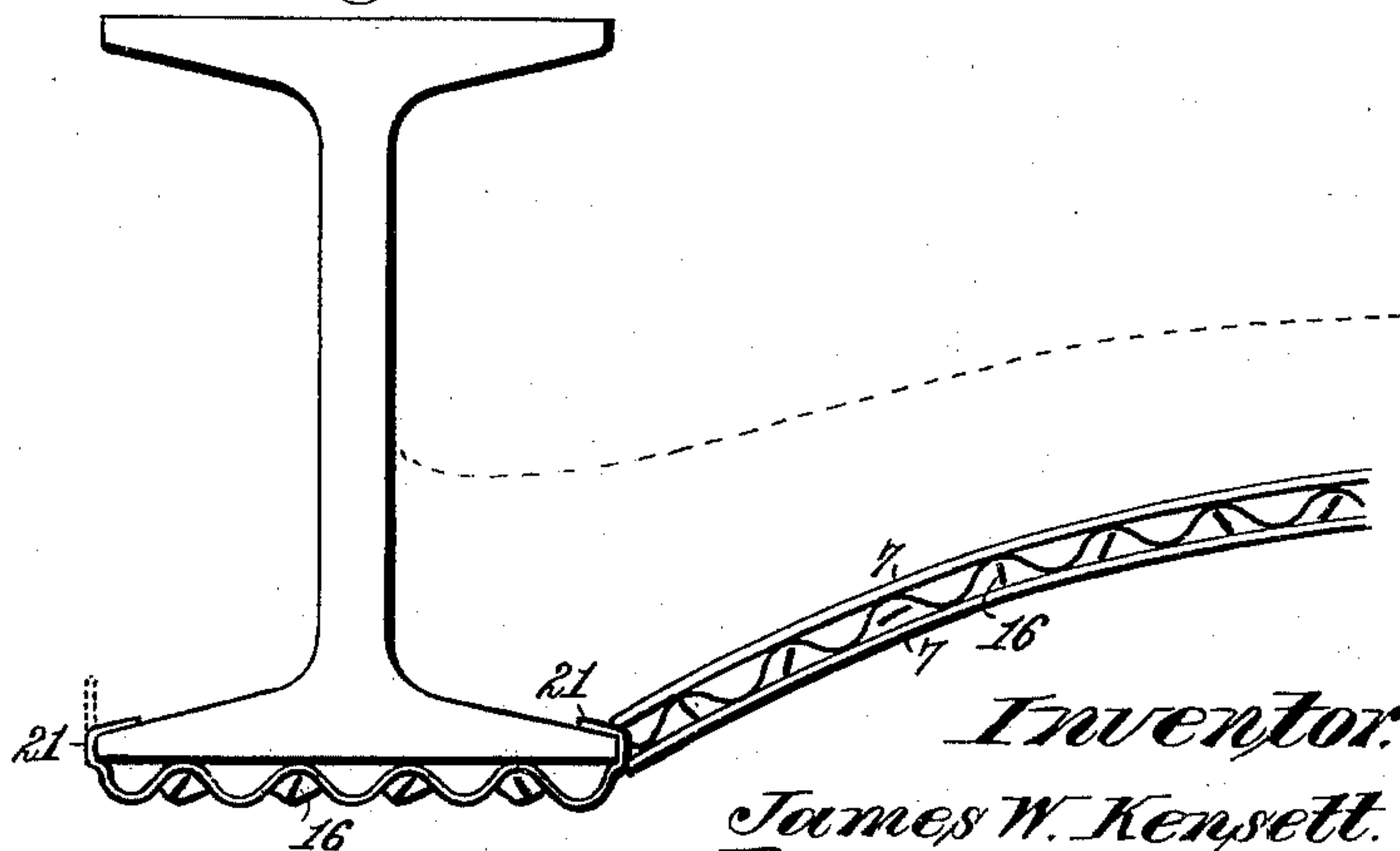


Fig. 11.



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UNITED STATES PATENT OFFICE.

JAMES W. KENSETT, OF NEWPORT, RHODE ISLAND, ASSIGNOR OF ONE-THIRD TO ARTHUR B. EMMONS, OF SAME PLACE.

METALLIC FIRE-PROOF STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 417,250, dated December 17, 1889.

Application filed January 31, 1889. Serial No. 298,293. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. KENSETT, a citizen of the United States, residing at Newport, in the county of Newport and State of Rhode Island, have invented new and useful Improvements in Metallic Fire-Proof Structures, of which the following is a specification.

My present invention relates to metallic fire-proof structures for interior and exterior walls, for floor, roof, and interior fittings, as well as for a great variety of other structures wherein great strength and cheapness are as essential as a light, durable, and quickly-erected fabric.

It is the purpose of my present invention to provide a simple and economical skeleton frame or studding composed entirely of metal and adapted to receive and firmly support an all-metal-lathing foundation, to which the plaster or cement may be applied upon either one or both faces.

It is the purpose of my invention, also, to so form and construct the metallic skeleton frame or studding that an exceedingly light, strong, and durable structure shall be provided not only for the various exterior and interior walls, roofs, and other purposes mentioned, but equally adapted to the erection of Mansard roofs and fire-walls, warehouses complete in all respects, sectional divisions for the same, the formation of artificial pavements, and the construction of various submerged structures—such as the walls of aquaria and tanks and reservoirs of various kinds—in which the presence of metal has been heretofore an objection, owing to its liability to oxidation.

It is a further purpose of my invention to provide an all-metal skeleton frame or studding adapted to support and firmly and securely bind in place the all-metal-lathing foundation shown and described in the Letters Patent granted me the 16th day of November, 1886, No. 352,826, the construction and combination of parts being such as to permit a rapid and economical erection and provide a light, strong, and permanently-durable support for the plastering to form a perfectly fire-proof wall, roof, or ceiling, as the case may be.

It is also a purpose of my invention to pro-

vide simple means of stiffening and bracing the metallic-lathing foundation at suitable intervals, whereby great strength and power of resistance to lateral strain are imparted thereto without material increase in weight or cost of material.

It is my purpose, finally, to provide simple and inexpensive means for rapidly and easily setting up and bracing or stiffening the metallic-lathing foundation and for rigidly and strongly connecting the studding whereby said lathing foundation is supported.

My invention also contemplates means whereby a metallic molding or facing may be cheaply and conveniently applied to the exposed faces or edges of studding and bracing-beams of iron, and whereby, also, facilities may be afforded for plastering the exposed faces or surfaces of iron rafters and girders, should it be deemed necessary.

I make provision also for a great variety of interior constructions, wherein walls or partitions may be provided with doorways and window-openings formed of my metallic studding, and whereby, also, any form of shelving, with its supports and many other features, may be easily and economically rendered portions of the interior fitting and partake of the strength, permanence, and fire-proof qualities of the main structure.

It is a feature of my invention, also, to provide cheap and simple means whereby the exposed edges of such shelving, as well as the jambs of doorways, windows, and similar parts, may be provided with a metallic facing, by which the ornamental appearance is greatly enhanced, the cost of such construction involving no increase in expense as compared with the use of wood for such purposes, while the security of the structure is greatly promoted by the absence of all combustible material.

The invention consists in the several novel features of construction and new combinations of parts hereinafter fully set forth, and then specifically pointed out and defined in the claims which follow this specification.

Referring to the accompanying drawings, Figure 1 is a front elevation showing my invention, the portion shown comprising a

skeleton frame and a portion of studding, together with a similar framing running at right angles, the figure also showing a length or section of the metallic-lathing foundation in place with part of the adjacent section. Fig. 2 is a vertical transverse section of Fig. 1 in the plane $x x$. Fig. 3 is a detail section, enlarged, of Fig. 1, taken in a horizontal plane passing through the vertical studding. Fig. 4 is a vertical cross-section, enlarged, of Fig. 1, the section plane passing through the longitudinal or horizontal studding or stiffening. Figs. 5 and 6 are detail perspectives showing different methods of constructing the intersecting members of the studding. Fig. 7 is a side or face elevation of a partial section of metallic foundation-plate with a single bracing or stiffening strip applied thereto. Fig. 8 is a detail perspective, part in section, of a shelf constructed in accordance with my invention and illustrating the manner of applying a metallic facing to the exposed edges thereof. Fig. 9 is a detail section of a metallic studding, showing one method of applying a metallic facing to the exposed edge thereof. Fig. 10 is a similar view showing a modified construction for the same purpose, the stud being shown in dotted lines. Fig. 11 is a detail view of a metal girder or rafter for floor, roof, or ceiling, showing the application thereto of my metallic foundation and lathing, whereby the exposed faces of such girders may be plastered, if desired. This view also shows the application or adaptation of my invention to the formation of the arches ordinarily composed of brick or other masonry.

In the said drawings, the reference-numeral 1 designates a skeleton frame or studding composed of upright members 2 and horizontal or transverse members 3. The upright portions 2 are composed of thin strips or plates 4 of iron, steel, or other metal rolled or otherwise formed in concavo-convex form in cross-section, whereby great strength is afforded with an exceedingly small weight or quantity of metal. Each of the members of the skeleton frame is formed of two of these strips 4, placed with their convex faces adjacent and bolted or riveted together, a washer, plate, or other intervening device being placed between said convex faces to slightly separate the same.

In setting up the skeleton frame or studding I may, and ordinarily I prefer to, use link-plates 5, consisting of short flat metallic plates inserted between the plates 4 and fastened by the bolts or rivets which unite the latter. The ends of these link-plates, projecting upon each side of the upright members 2, afford a convenient attachment for the ends of the horizontal members 3, which are lapped at their ends upon opposite faces of the projecting ends of the link-plates, and a bolt or rivet inserted through all three, as plainly seen in Fig. 3. Instead of flat link-plates, however, I may use plates which are

curved or shaped to conform to the convex surfaces against which they lie, and I may employ one, two, or even more of such plates at each point.

The horizontal members 3 of the studding may be of diminished width and weight as compared with the intersecting members, and while I may simply form perforations 6 in the concave ends of the plates 7, composing said horizontal or transverse members, and thereby effect their attachment, as shown in Fig. 5, I may also slightly notch the edges of said plates 7 and then flatten the ends of said plates, as shown in Fig. 6, the flattened ends being lapped upon and connected to the projecting ends of the link-plates and fastened by a bolt or rivet 8, set in a perforation 9. I may, however, use one or more curved washers to separate the plates 4 and connect the horizontal and transverse members of the frame by lapping one directly upon the other and bolting or riveting through both.

Along the concave faces of the plates composing the studding run spiral metallic-lathing strips 9^a, supported by loops or eyes 10, which are struck from or attached to the concavo-convex plates or strips. I prefer, however, to attach these spiral laths by lapping metallic facings 12 upon the concave faces of these strips or plates, said facings having the supporting-loops 10 struck therefrom at suitable intervals. These metallic facings are simply lapped over the edges of the plates to which they are attached and caused to conform substantially to the face of the strip or plate on which they are mounted. The skeleton frame or studding thus constructed forms a support for any suitable form of all-metal lathing—such, for example, as the metallic-lathing foundation shown in the drawings in Figs. 1, 2, 4, 7, 8, and 11. This lathing foundation is composed of a thin sheet of metal, such as iron galvanized or otherwise corrugated to form parallel projections 13 alternately with depressions 14, and provided with suitable loops or eyes 15, which receive and support spiral metallic laths 16. This lathing foundation is set within the studding already described, its margins seating in the channels 17, formed by the diverging edges of the plates or strips 4 and 7, thereby providing a structure which possesses great strength, firmness, and rigidity, and one that is absolutely fire-proof.

I may apply suitable bracing or stiffening pieces 18 at intervals, said parts being composed of light metal plates or strips concavo-convex in cross-section, or, as they are sometimes termed, "half-round." These pieces are simply laid in the depressions 14 of the lathing foundation, with their extremities resting in the spaces between the strips 4 of the studding by which they are supported, and they are fastened by one or more rivets or similar fastenings 19. These stiffening-pieces are of small weight, their concavo-convex form giving them a remarkable rigidity,

and when combined at intervals with the metallic-lathing foundation a light inexpensive construction is provided capable of offering great resistance to the lateral or other strain.

5 To the structure thus formed plaster or cement may be applied upon either one or both faces, to which it will readily and firmly adhere.

For ordinary purposes—such as common
10 partition-walls, roofs, &c.—a single studding will generally be sufficient; but when circumstances require two parallel studdings the lathing may be used with an air-space between, or this air-space may be filled with
15 cement or suitable deafening materials. I may make the stiffening-pieces 18 elliptical in cross-section, and I may also extend each piece to support two or more sections of lathing foundation, simply flattening the brace
20 and passing it between the bars or plates of the studding, with a washer, if necessary, and a bolt passing through all the parts.

In the different forms of interior construction wherein my invention may be applied to walls
25 and partitions containing doorways, window-openings, and similar spaces it is evident that the jambs or edges of the studding will be exposed, and for the purpose of providing a permanent ornamental molding or facing in such
30 positions I employ the construction illustrated in Figs. 8, 9, and 10, wherein the numeral 19 denotes a thin plate, which is folded to embrace one or both margins of each strip 7 of the studding, while the body or central part
35 of said plate rests against and covers the exposed edges of said plates or strips. The covering portion of the plate may be either convex or flat, as shown in Figs. 9 and 10, respectively, and the metal may upon its ex-
40 posed face be either plated, painted, or otherwise ornamented and protected.

In applying this covering or molding I may strike up lips 20 in the plate, said lips being caused to overlap the exposed edges of the
45 studding, as in Fig. 9, while the two marginal portions of the plate lie upon the convex faces of the studding-strips, their edges 20 being lapped over upon the inner margins of the strips of the studding. This construction
50 gives a strong, firm, and permanent attachment to the molding.

When the floor or roof is composed in whole or in part of any of the forms of girders or rafters commonly used, one form of which is
55 shown in Fig. 11, I may apply the metallic-lathing foundation to the exposed face of such girder by simply providing it with ears or projections 21, which are caught over the parallel edges of the girder; or the foundation may be of such width as to permit its
60 marginal portions themselves to be folded around and upon the edges of the girder; or the ends of the lathing foundation may be flattened and bent over the edges of the girder.
65 This provides a facing of lathing for these heavy metallic girders, to which plaster or

cement may be applied in any desired manner.

It should be noted that the plates composing the studding may be bent or curved into
70 any desired form, and may be applied to the formation of arches, cornices, curves, and other forms.

I have shown in Fig. 11 the application of the invention to the springing of an arch from
75 an ordinary girder, the studding being simply bent to the curve required, while the curvature being transverse to the line of corrugation of the lathing foundation the latter readily accommodates itself to the desired form
80 and provides an admirable surface for the application of plaster. The space above the arch may be filled or partly filled with plaster or cement, if desired.

This invention provides, also, convenient
85 means for forming shelving, as illustrated in Fig. 8, wherein the studding-frame is shown projecting horizontally over a vertical support and with plaster applied to both sides, the exposed margin of the shelf being pro-
90 tected and ornamented by the metallic molding or facing 19.

By my invention I provide an all-metal frame which is constructed at small expense and may be quickly and easily set up to form
95 studding for walls and partitions, or to constitute the frame-work for floors or roofs or for tiling. This frame provides a complete and perfect support and fastening for the metallic-lathing foundation, in conjunction
100 with which it forms a stiff impervious structure having great strength, wholly fire-proof, extremely light, and capable of being erected with great speed and at an extremely small
105 expense as compared with ordinary metallic structures. By forming the studding of the concaved or trough-shaped strips as set forth I obtain great strength and stiffness with but little weight, while this construction also af-
110 fords a convenient seat for the margin of the metallic-lathing foundation. The same principle of construction also applies to the auxiliary bracing-strips, and has been utilized in the construction of metallic-lathing founda-
115 tions, thereby giving a structure which is extremely light, but possesses remarkable strength and durability. Moreover, the present invention affords means expressly adapted to be used in conjunction with the metallic-lathing foundation covered by the Let-
120 ters Patent heretofore granted me upon the 16th day of November, 1886, No. 352,826. It should be noted, also, that with the metallic frame or support described hereinbefore the metallic foundation and lathing may be used
125 in the construction of pavements of artificial stone and for similar purposes. It is also admirably adapted to the construction of Mansard roofs and fire-walls, and may be used
130 in every place and for all the purposes to which other material has been supposed indispensable. I may also employ with the

novel metallic studding shown any desired form of metallic lathing and lathing foundation, whether the same be that shown in my Letters Patent referred to or any other form.

I may use light T-irons or angle-plates, and attach the metallic-lathing foundation to the same in certain constructions by drilling or punching suitable openings in the edges and connecting the studding thereto by bolts.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In all-metal structures for walls, roofs, and other purposes, a studding or skeleton frame composed of intersecting members, each formed of metallic strips or plates which are concavo-convex in cross-section, placed with their convex faces adjacent and united by suitable fastenings, substantially as described.

2. In all-metal structures for walls, roofs, and other structures, a studding or skeleton frame composed of intersecting members, each consisting of two concavo-convex metallic strips or plates placed with their convex faces adjacent and fastened together by bolts or rivets, which also pass through separating plates or washers, substantially as described.

3. An all-metal-foundation structure for plastered walls, roofs, ceilings, or other purposes, the same consisting of a frame or studding the members of which are composed of strips or plates which are concavo-convex in cross-section, placed with their convex faces adjacent, link-plates inserted between and bolted to the united strips or plates, and similarly-constructed transverse members of the frame attached to the projecting ends of the link plates, substantially as described.

4. An all-metal-foundation structure for plastered walls, roofs, floors, and other purposes, the same consisting of a frame-work or studding composed of metallic strips of substantially concave form in cross-section and bolted together with their convex faces adjacent, and a metallic-lathing foundation having its marginal portions lying between said strips, substantially as described.

5. An all-metal-foundation structure for plastered walls, roofs, floors, and other purposes, the same consisting of a frame or studding composed of strips which are concavo-convex in cross-section, said strips being placed with their convex faces adjacent and separated from contact, and a metallic-lathing foundation having its edges lying in the channels between said strips, substantially as described.

6. In an all-metal-foundation structure for plastered walls and other purposes, the combination, with a frame-work or studding composed of strips concave in cross-section, placed with their concave faces outward, and united to interposed link-plates, transverse strips similarly formed and arranged and fastened to the ends of said link-plates, metallic-lathing foundations having their edges lying between the edges of said strips, and bracing-strips concaved or trough-shaped and laid in the depressions of the lathing foundations, substantially as described.

7. In an all-metal-foundation structure for plastered walls, the combination, with a frame-work or studding formed of concave or trough-shaped strips placed with their convex faces adjacent and united by bolts passing through an interposed separating-plate, of metallic-lathing foundations having their edges seated between said strips, and bracing-strips lying in the depressions of said foundations, the concave faces of the studding being provided with spiral lathing running longitudinally, substantially as described.

8. The combination, with a frame-work or studding composed of strips which are concave in cross-section, placed back to back, and united, of a metallic molding or casing consisting of a plate covering two edges of said strips and having its edges bent around or over the other two edges to hold said molding or facing in place, substantially as described.

9. The combination, with a frame-work or studding composed of parallel strips slightly separated and bolted together, of a metallic molding or facing covering two exposed edges of said studding and having its edges bent around or upon the two remaining edges, substantially as described.

10. The combination, with a frame-work or studding composed of concave or trough-shaped strips placed with their convex faces adjacent and united, of a metallic facing or molding consisting of a plate covering the outer edges of said studding and having lips which embrace the same, the marginal portions of said plate being passed between the strips and bent over or upon the inner edges, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

JAMES W. KENSETT.

Witnesses:

JAMES L. NORRIS,
GEO. W. REA.