

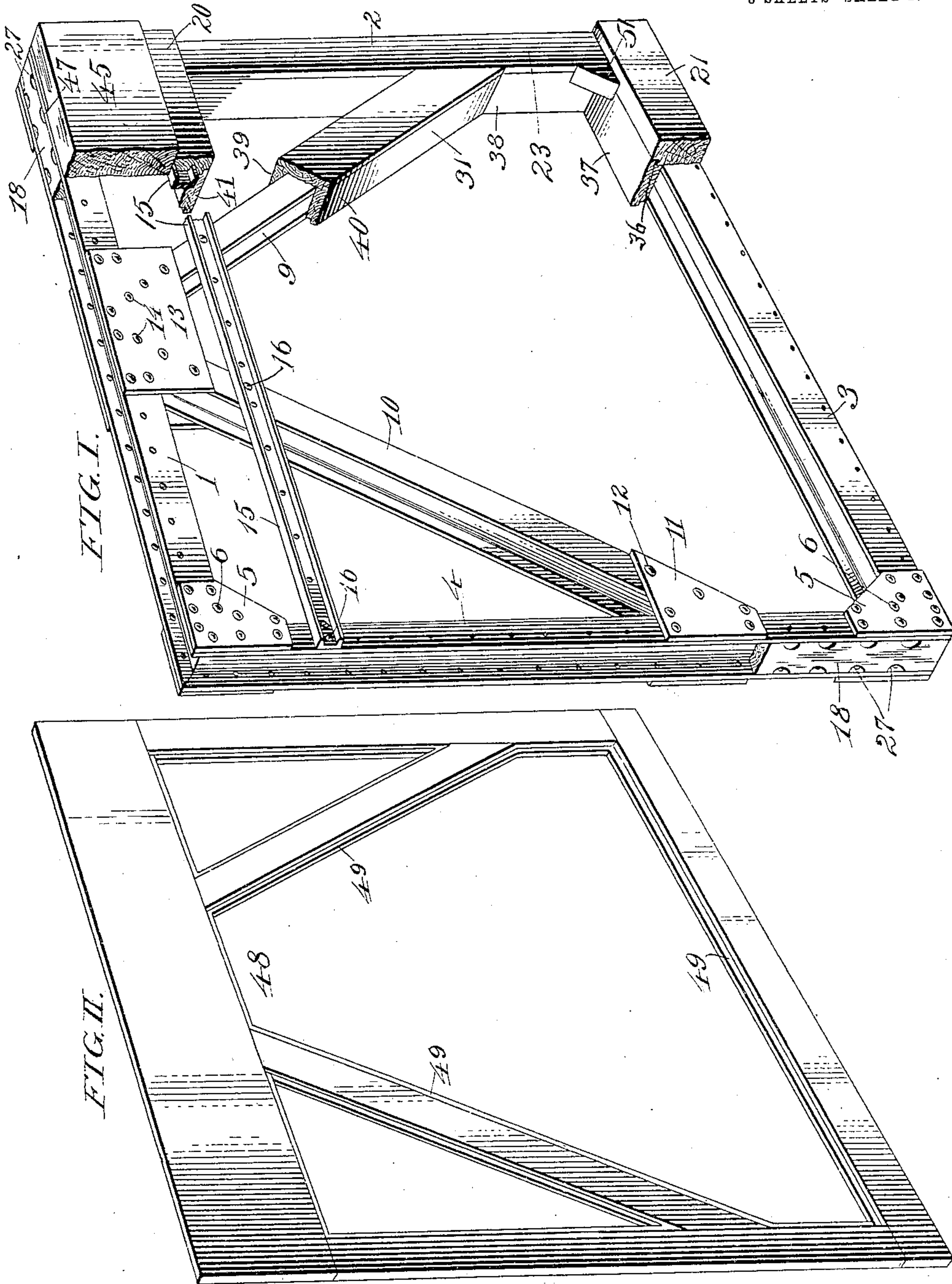
No. 841,238.

PATENTED JAN. 15, 1907.

P. DUFFY.
PIANO.

APPLICATION FILED AUG. 17, 1904.

3 SHEETS—SHEET 1.



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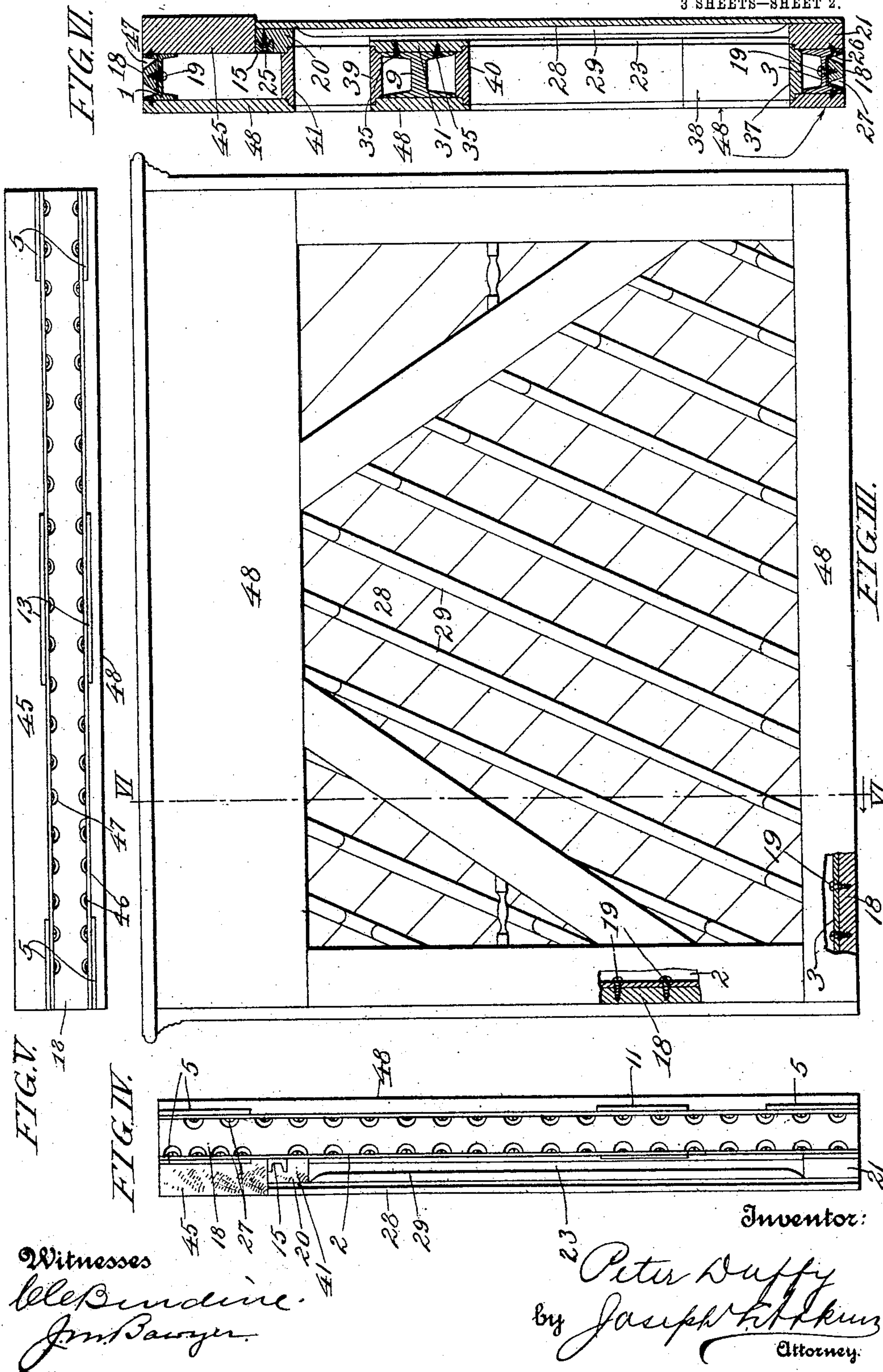
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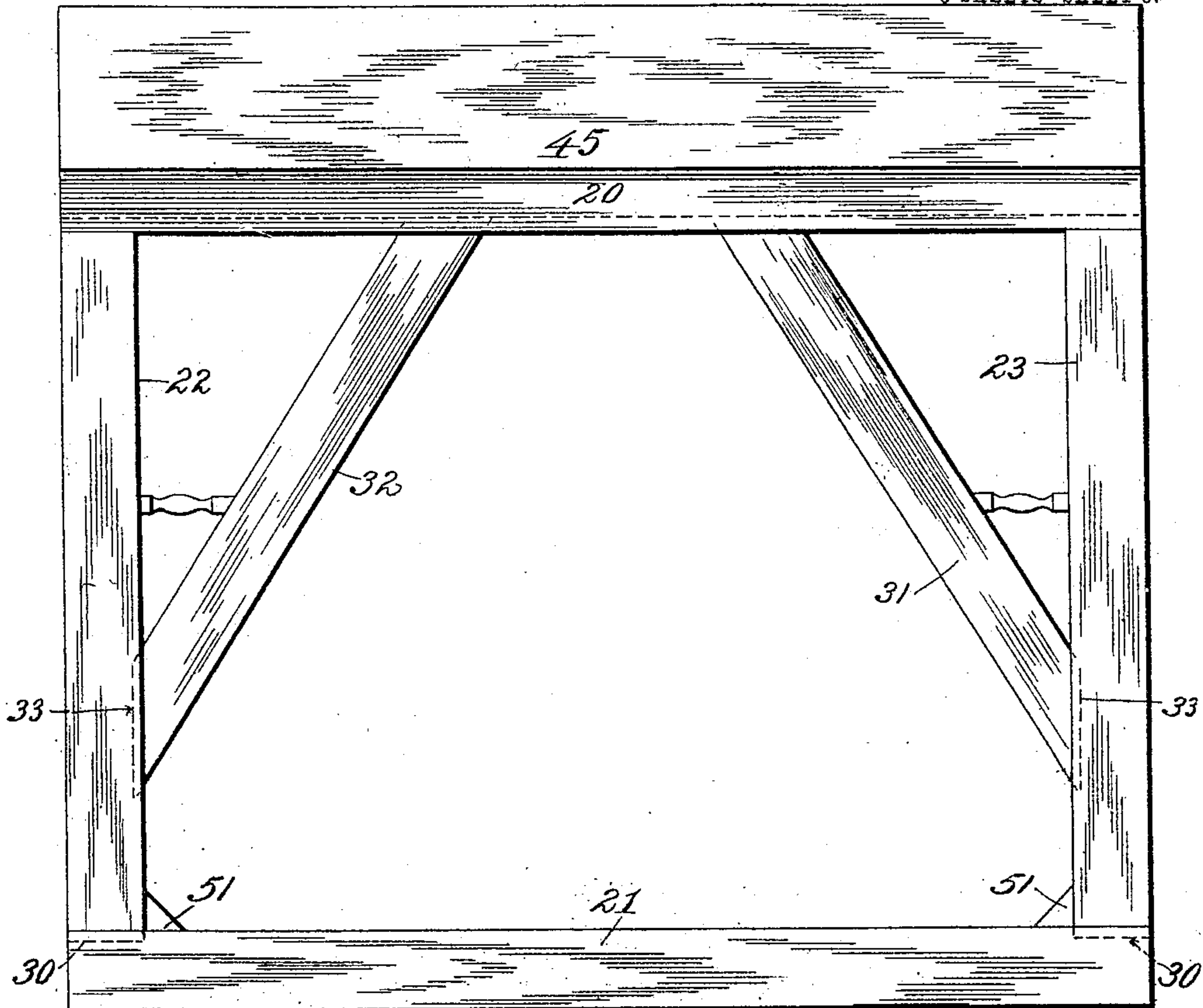


FIG. VII.

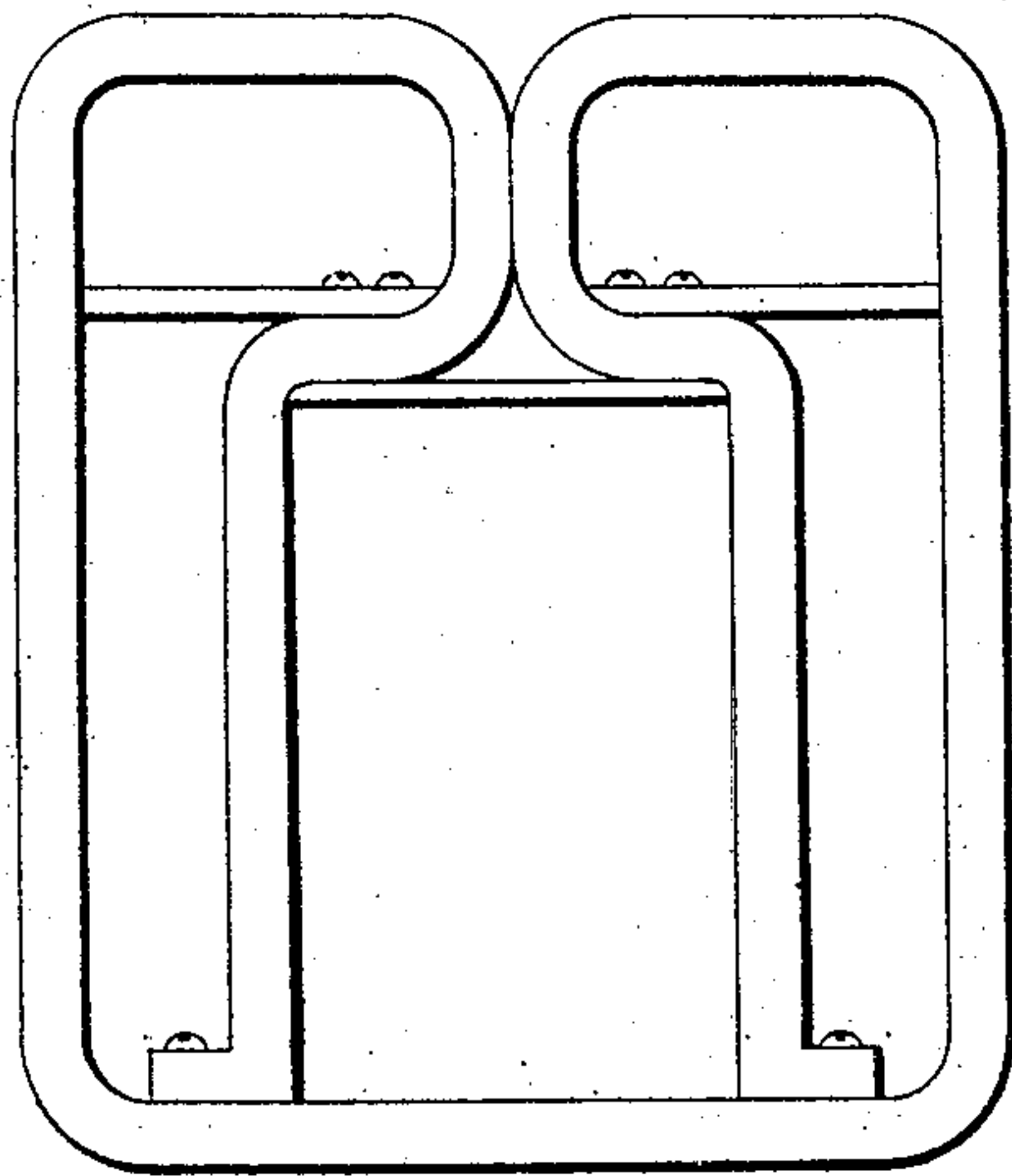


FIG. VIII.

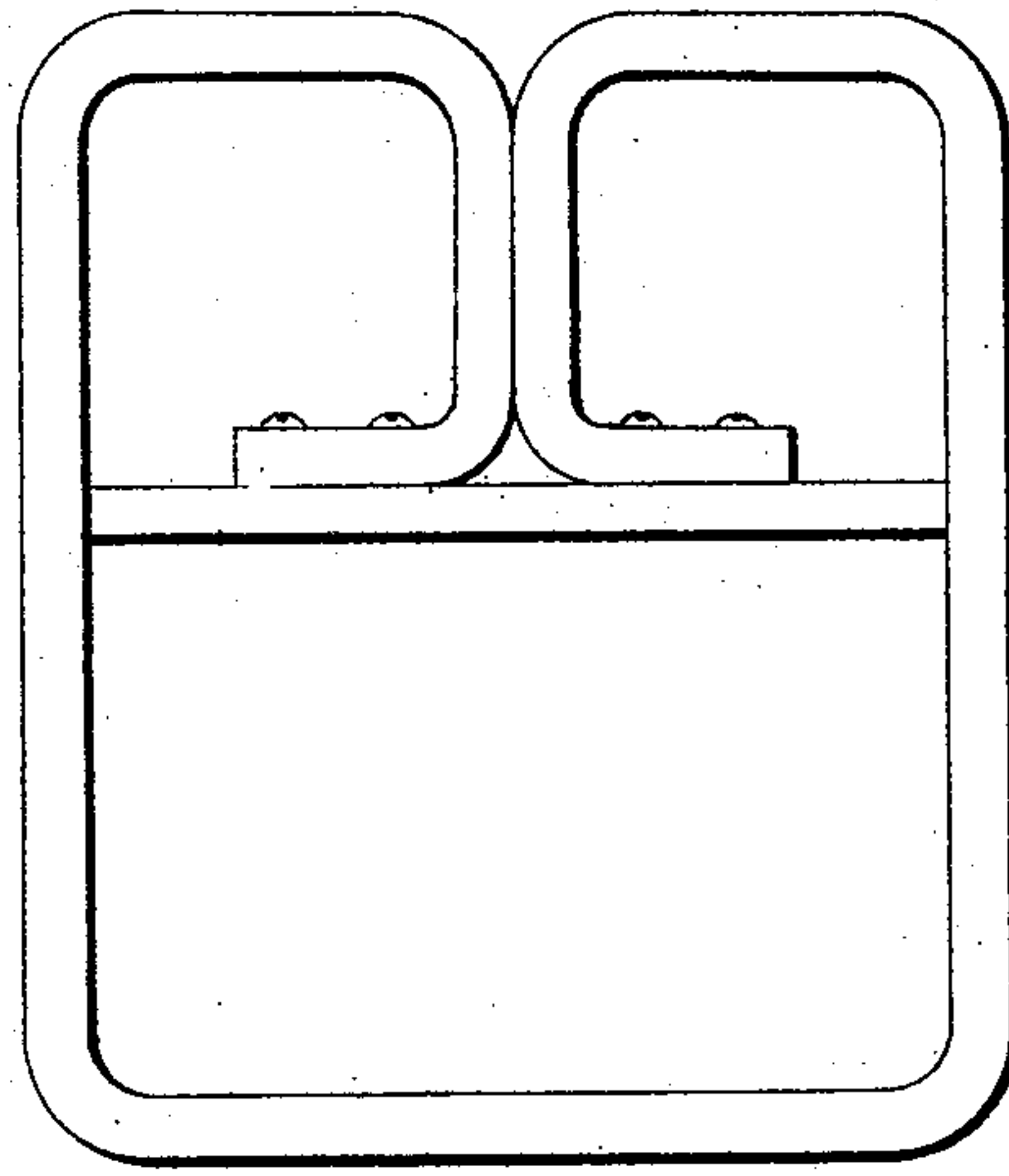


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PIANO.

No. 841,238.

Specification of Letters Patent.

Patented Jan. 15, 1907.

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To all whom it may concern:

Be it known that I, PETER DUFFY, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Pianos, of which the following is a specification.

My invention relates to pianoforte construction, and has for its object in any type of pianoforte—such, for instance, as grand, square, or upright—the production of a frame or string-tension-sustaining member of a composite order designed and adapted to combine all the desirable qualities of a metal frame and a wooden frame.

Piano-frames, generally speaking, were for many years commonly made of wood, and these, while objectionable on account of the great weight of material necessarily employed to secure the requisite rigidity and strength, lent certain attractive qualities of tone to the instrument. There was and is nevertheless an objection to the use of wooden frames in addition to their weight above mentioned because of their sensitiveness to atmospheric conditions and changes. With a view to obviating or eliminating the objections specified, as well as others unnecessary to mention, the use of metal in piano-frame construction has been resorted to, and while it may be and doubtless is true that certain distinct advantages in the tonal, as well as other qualities of the instrument have been gained through the judicious employment of the metallic construction referred to, yet it is equally true that certain qualities, particularly of tone belonging to the wooden frame, have been lost. These qualities being preferred by many, it is the object of my present invention, as above suggested, to produce an instrument through the construction of whose frame they may be preserved along with other qualities peculiar to metal-frame construction.

My invention in its broader aspect consists in a metal-and-wood construction which shall impart to the instrument those desirable tonal and other qualities above referred to.

The frame in the preferred form of embodiment of my invention, being constructed throughout of a skeleton of metal, preferably of steel, is in whole or in part insheathed in wood. The construction might therefore be called a "sheathed" construction; but inasmuch as the metallic skeleton need not be en-

tirely covered with the wood with which it is combined, although, by preference, it is so covered, and because in every conceivable form of embodiment of my invention the wood of the frame is reinforced by the metallic skeleton, which is always present as a source of lightness, coupled with rigidity, in the structure, I prefer to denominate my frame by analogy drawn from other arts a "reinforced" frame. It should be observed, however, that this term is more or less conventional in its scope, although accurately describing the invention from that viewpoint in which the composite frame is regarded as a wooden frame, which, in effect, it is, but deriving its stress-resisting stiffness from the metal, which supplements and is combined with the wood. On the other hand and from another point of view, the frame is a metal frame which is so far enveloped in wood as to impart to the instrument in which it is embodied a tonal quality heretofore derivable only from an all-wood frame.

What constitutes my invention will be hereinafter specified in detail and succinctly set forth in the appended claims.

In the accompanying drawings, to which reference is made as constituting a part of this specification, Figure I is a perspective front view of a preferred form of embodiment of the metallic portion of my frame complete, showing the preferred structural disposition of the wooden members which envelop it, the sounding-board being omitted. Fig. II is a similar view of the assembled back-sheathing member ready to be applied to the frame shown in Fig. I. Fig. III is a view of the back of one of my pianos complete, a portion being broken away to illustrate structural features thereof. Fig. IV is an end elevation of the subject-matter of Fig. III with the piano-case removed. Fig. V is a top plan view corresponding to Fig. IV. Fig. VI is a section on the line VI VI of Fig. III looking toward the nearer end of the instrument and with the case omitted, as in Figs. IV and V. Fig. VII is a front elevation of the subject-matter of Fig. III with the case, sounding-board, and strings omitted. Fig. VIII is a side elevation of a modified form of the metal portion of my composite frame as made in one piece. Fig. IX is a view similar to Fig. VIII, showing a further modification of the metal frame-piece.

Referring to the numerals on the drawings, and particularly at the outset to Fig. I thereof, 1 and 3 indicate, respectively, the top and bottom members, and 2 and 4 the side members of a preferred form of metal-reinforcing frame. The several members specified are made, preferably, of channeled or I-beam steel, mitered or otherwise joined at the several corners of the frame, where they are secured together by corner-plates 5 and a suitable number of rivets 6. Brace-pieces 9 and 10 preferably extend between the side pieces 2 and 4, respectively, and the top piece 1. They are secured, respectively, to the side pieces, as by cheek-plates 11 and rivets 12, and are both secured to the top piece 1, as by cheek-plates 13 and rivets 14.

15 indicates a channeled cross-brace extending from one side of the frame to the other and incorporated with it, as by rivets 16 or the like, which secure it to the members 2 and 4 and 9 and 10, respectively.

The frame above described, constituting, as specified, a preferred form of metallic frame for the purpose in view, but which is susceptible of wide variation as to details, represents the metallic reinforcing-frame ready for the application to it of the wooden members, which, according to my invention, insheathes and preferably completely envelop it. The wooden members must be adapted to fit the frame for which they are intended, and they will be accordingly described with consideration of the frame shown in Fig. I, and with particular reference to that figure, special reference to other figures where it occurs being duly indicated. First, I fit the outer channels of the members 1 to 4, inclusive, with wooden fillet-pieces 18, so as to close that channel in the metal frame on all sides. Two portions of the fillet-pieces are shown in Fig. I, and two complete fillet-pieces are shown in Figs. IV and V, respectively. The fillet-pieces 18 are secured by screws 19, (see Fig. VI,) disposed at frequent intervals and entering the fillet-pieces through the web of the I-beams 1 to 4, inclusive, from the inside of which they are introduced, as shown in Fig. VI. I next apply the sheathing-piece 20 to the channeled brace 15, the sheathing-piece 21 to the bottom I-beam 3, and the side-sheathing pieces 22 and 23 (compare Figs. I and VII) to the I-beams 2 and 4, respectively. The sheathing-piece 20, being cut or shaped to fit the channeled brace 15, is secured thereto, as by a series of screws 25, introduced from the inside of the said brace-piece, as illustrated in Fig. VI. The remaining sheathing-pieces 21 to 23, inclusive, are secured to the I-beams, to which they are applied, preferably, as by screws 26, introduced at frequent intervals through a flange of the respective I-beams, as shown, for example, in Fig. VI. Recesses 27 must be provided in the several fillets 18 for the

accommodation of the screws 26. Such recesses are shown, for example, in Fig. IV.

It should be observed that the sheathing-pieces 20 and 21, respectively, have their front surfaces in the same plane, as clearly shown in Figs. IV and VI, and are of greater thickness than the sheathing-pieces 22 and 23. This construction is necessary in order to provide for the accommodation of a sounding-board 28 and its ribs 29, the sounding-board being directly secured to the members 20 and 21, as will clearly appear upon comparison of Figs. IV, V, and VI.

After the sheathing-pieces 20 and 21 are secured in place the sheathing-pieces 22 and 23 are fitted and glued into position between the sheathing-pieces 20 and 21, as shown in Fig. VII, each of the pieces 22 and 23 being provided with a tongue 30 for engagement with the pieces 20 and 21, respectively, as is shown in Fig. VII in comparison with Fig. I. After the pieces 22 and 23 are fitted and glued they are also secured by the introduction, through one flange of their respective I-beams, of screws 26, for whose accommodation the recesses 27 in the fillets 18 are, as previously specified, provided. To the braces 9 and 10 are applied sheathing-pieces 31 and 32, respectively, each being provided at each end with a tongue 33, (see Fig. VII,) which makes engagement with the sheathing-pieces 20, 22, and 23, respectively, as shown in Fig. VII. After being fitted and glued to the braces the sheathing-pieces 31 and 32 are further secured, as by screws 35, introduced through the flange of the I-beams 9 and 10, respectively, as illustrated in Fig. VI of the drawings.

The inner faces of the sheathing-pieces 20 to 23, inclusive, as well as 31 and 32, are preferably provided, as shown in Figs. I and VI of the drawings, with a rabbet 36, adapted to accommodate a correspondingly-rabbeted sheathing-piece, and they are by the aid of the two overlapping rabbets fitted and securely glued together.

Referring to Fig. I, the rabbeted member, which is connected with the sheathing-piece 21, is indicated by the numeral 37 and extends between the members 2 and 4, respectively, which members are respectively accommodated with a like sheathing-piece, (indicated by the numeral 38,) of which there are two, one being shown in Fig. I. The sheathing-piece 38 is broken for the accommodation of the sheathing of the brace 9 or 10, as the case may be, each of which are provided upon opposite sides with sheathing-pieces 39 and 40, as shown in Fig. I of the drawings. The sheathing-pieces 39 and 40 are both rabbeted, as previously specified, those applied to the brace 10 being substantially the same as those shown in Fig. I as applied to the brace 9. The sheathing-pieces 39 and 40 are preferably united to the sheath-

ing-piece 38, where it meets them upon opposite sides of the brace in a snugly-fitting mitered joint.

The sheathing-piece which is applied below the brace 15 to the rabbeted sheathing-piece 20—as shown in Figs. I and VI, for example—is indicated by the reference numeral 41. The member 41 extends from side to side of the metal frame, but with breaks for the accommodation of the braces 9 and 10, where it is joined with the sheathing-pieces 39 and 30, respectively, of each of those braces in suitable mitered joints, like the mitered joints previously specified.

The application of a wrest-plank 45 completes the sheathing of the front part of the metal frame. The wrest-plank is applied directly above the sheathing-piece 20 and is secured to the metal frame, as by a series of screws 46, introduced through the web of the I-beam 1 and the I-beams 2 and 4, respectively, where recesses 47 in the fillets 18 are provided for their accommodation. Disposition of the screws 46 and their recesses 47 will appear upon comparison of Figs. IV, V, and VI of the drawings.

Hitherto I have specified the complete sheathing of the metal frame, with the exception of the back-sheathing member. (Shown in Fig. II.) In assembling the back-sheathing member the several members which compose it, corresponding to the members 20, 21, 22, 23, 31, and 32, are preferably not applied one by one to the several members which they respectively cover, but are assembled in a unitary structure, as shown in Fig. II, (designated by the reference-numeral 48.) The back-sheathing member 48 is coextensive with the outside dimensions of the metal frame and is provided along each of its inner edges with a rabbet 49, adapted to engage and fit the rabbet 36, previously described, and which along the edges upon which the rabbet 49 is provided presents itself for engagement therewith. When the back-sheathing member 48, of suitable dimensions, is fitted, it is applied and glued to the metal frame and through the rabbet 36 to the several sheathing-pieces presented to it, thus completing the envelopment of the metal frame in wood. Along the outside of the wood envelop the

uncovered edges of the flanges of the I-beams are presented—as shown, for example, in Figs. IV and V; but these in the completed instrument are perfectly covered by the wood of the case 50, as shown in Fig. V.

It may be observed in this connection that each of the corner-plates 5 is covered by a wooden corner-block 51, assembled with the sheathing and fitted to the respective corner-plates 5.

In the assembling of the wooden and metallic members of my frame, respectively, the wood is worked to accommodate the projections on the metal frame snugly, so that the wood and metal may be combined into a solid, compact, unitary structure. This fitting of the metal and the wooden members may be accomplished by the use of suitable machinery known in the woodworking art, by which the desired effect may be accurately and economically arrived at.

What I claim is—

1. A pianoforte-frame consisting of a composite structure comprising a complete external covering of wood, and an interior reinforcement of metal insheathed within the wood.
 2. The combination in a pianoforte-frame, of a skeleton of metal with a sheathing throughout of wood incorporated together into a unitary structure.
 3. In a pianoforte-frame of composite structure of wood and metal, the combination with a channeled metal skeleton throughout, of a complete sheathing of wood, part of which is set in the channel of the skeleton.
 4. In a pianoforte-frame, the combination with a skeleton of metal adapted to afford comparative lightness and rigidity of structure, of sheathing-pieces of wood applied to and incorporated with the skeleton and so far enveloping the same as to impart substantially to the instrument in which it is embodied the tonal quality of an all-wood frame.
- In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

PETER DUFFY.

Witnesses:

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