Feb. 7, 1928. 1,658,336

J. W. ISHERWOOD

FLOATING VESSEL

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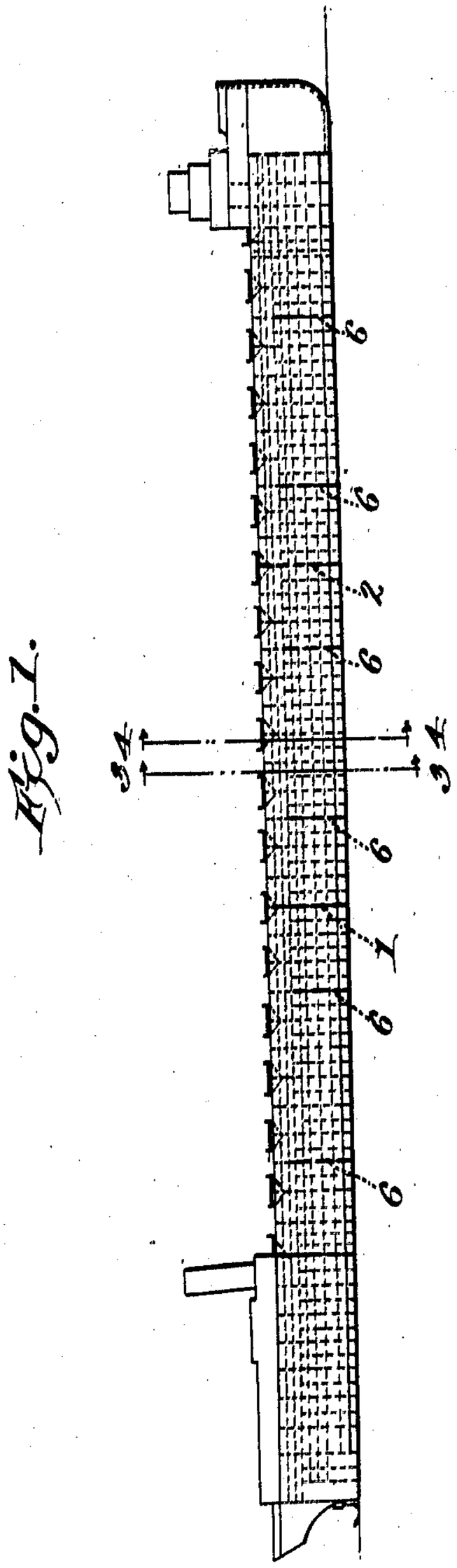

Fig. 1.

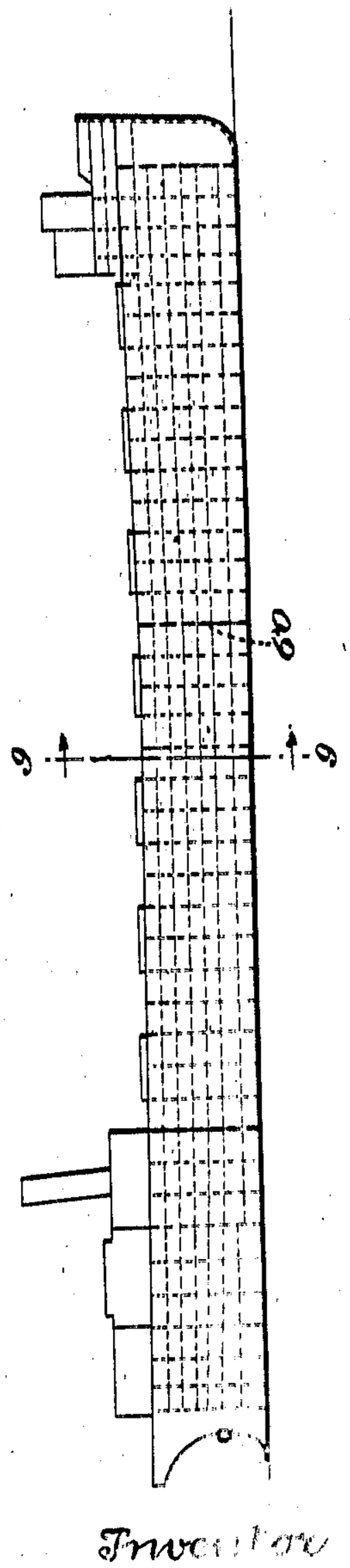

Fig. 2.

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Fig. 3.

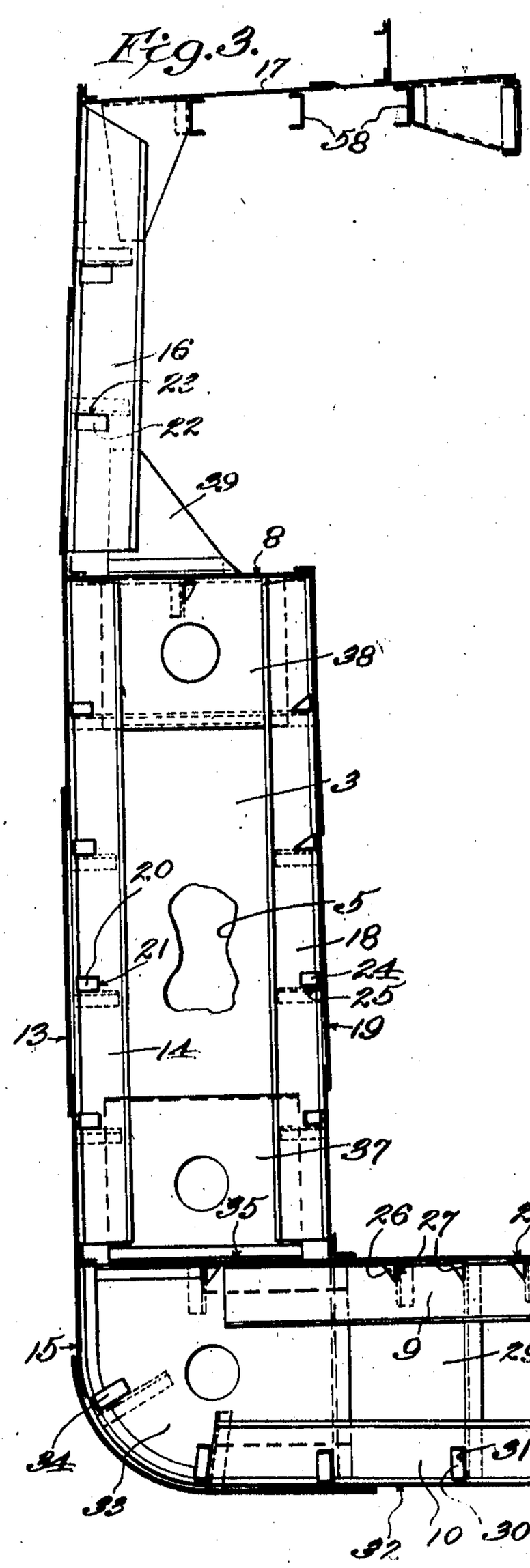
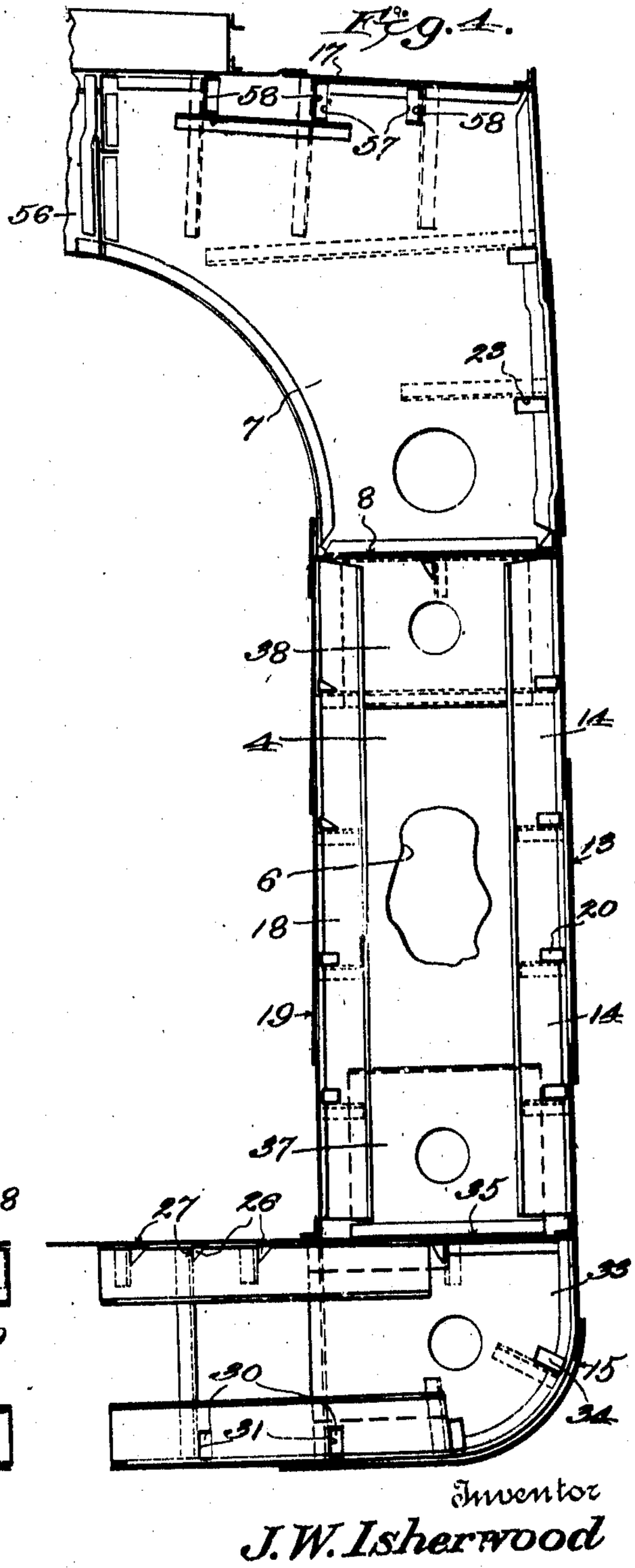


Fig. 4.



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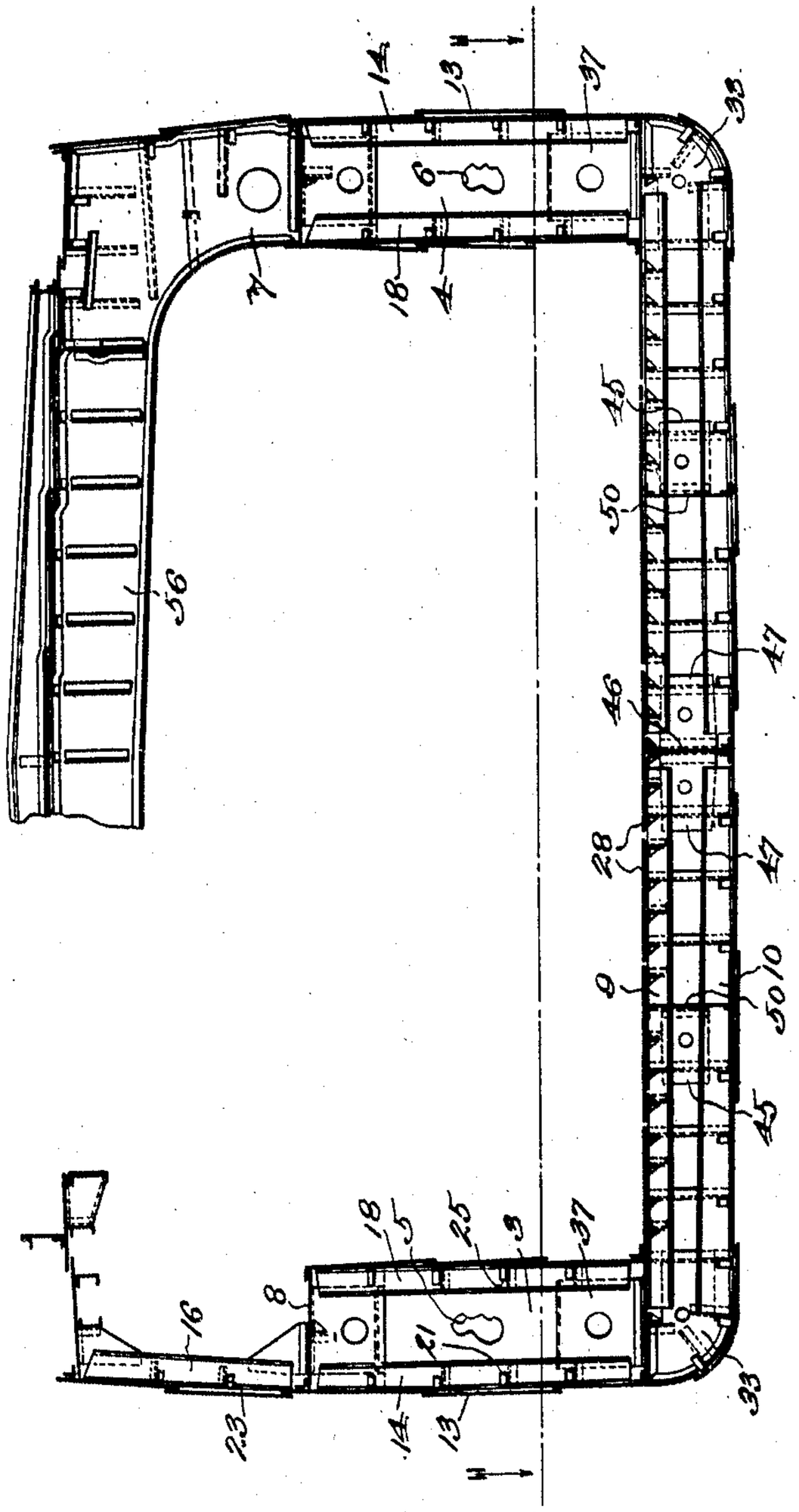

Fig. 5.

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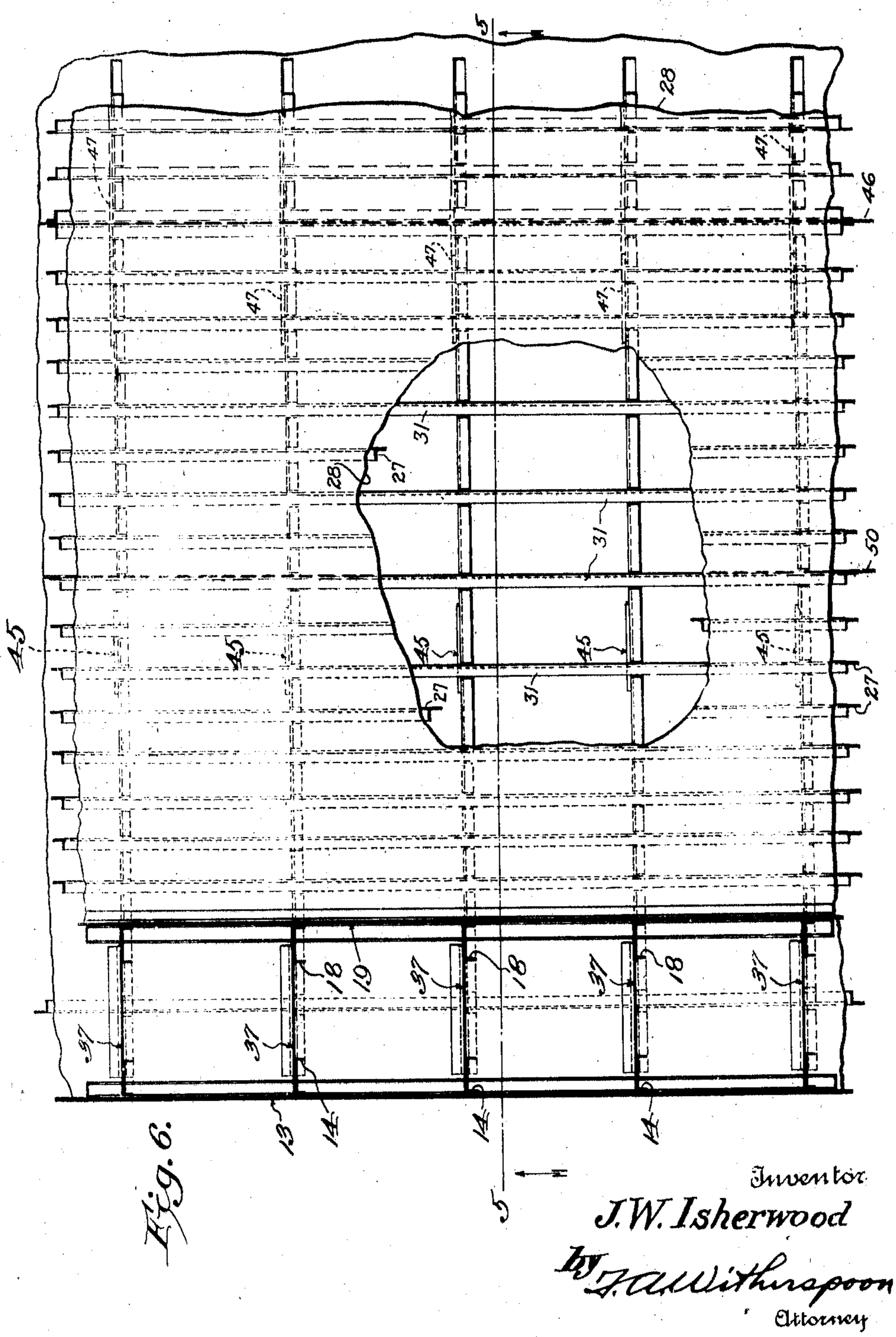

Fig. 6.

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Fig. 7.

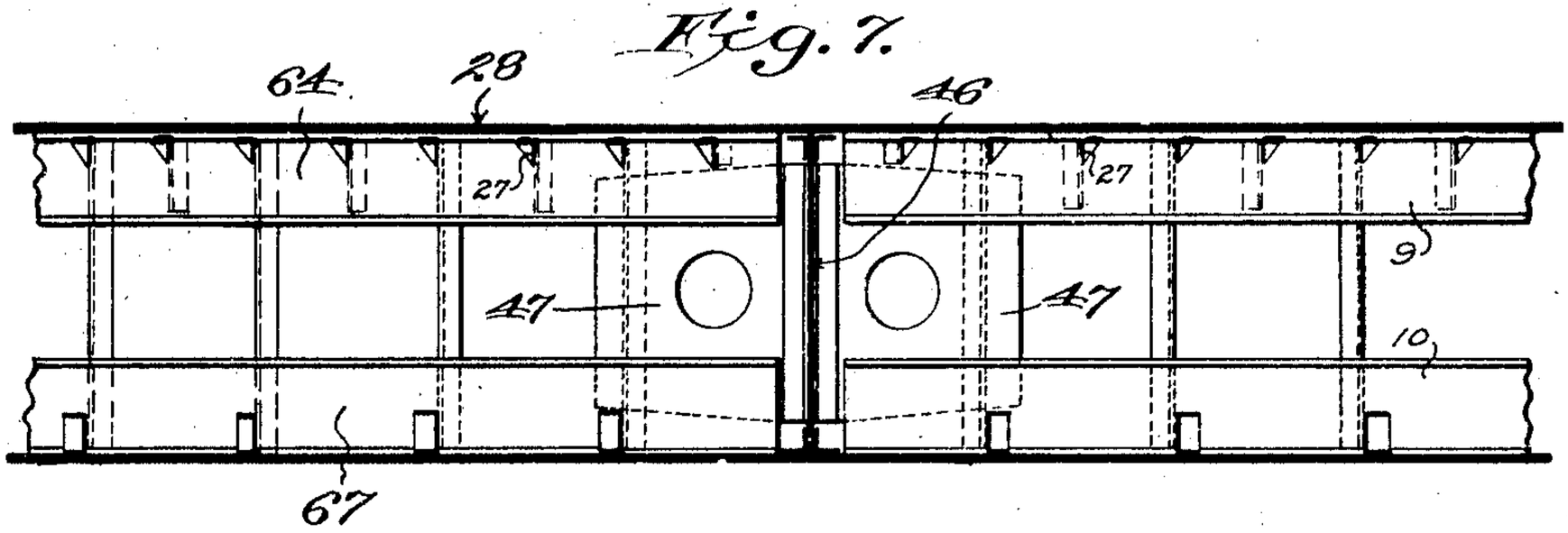

Fig. 8.

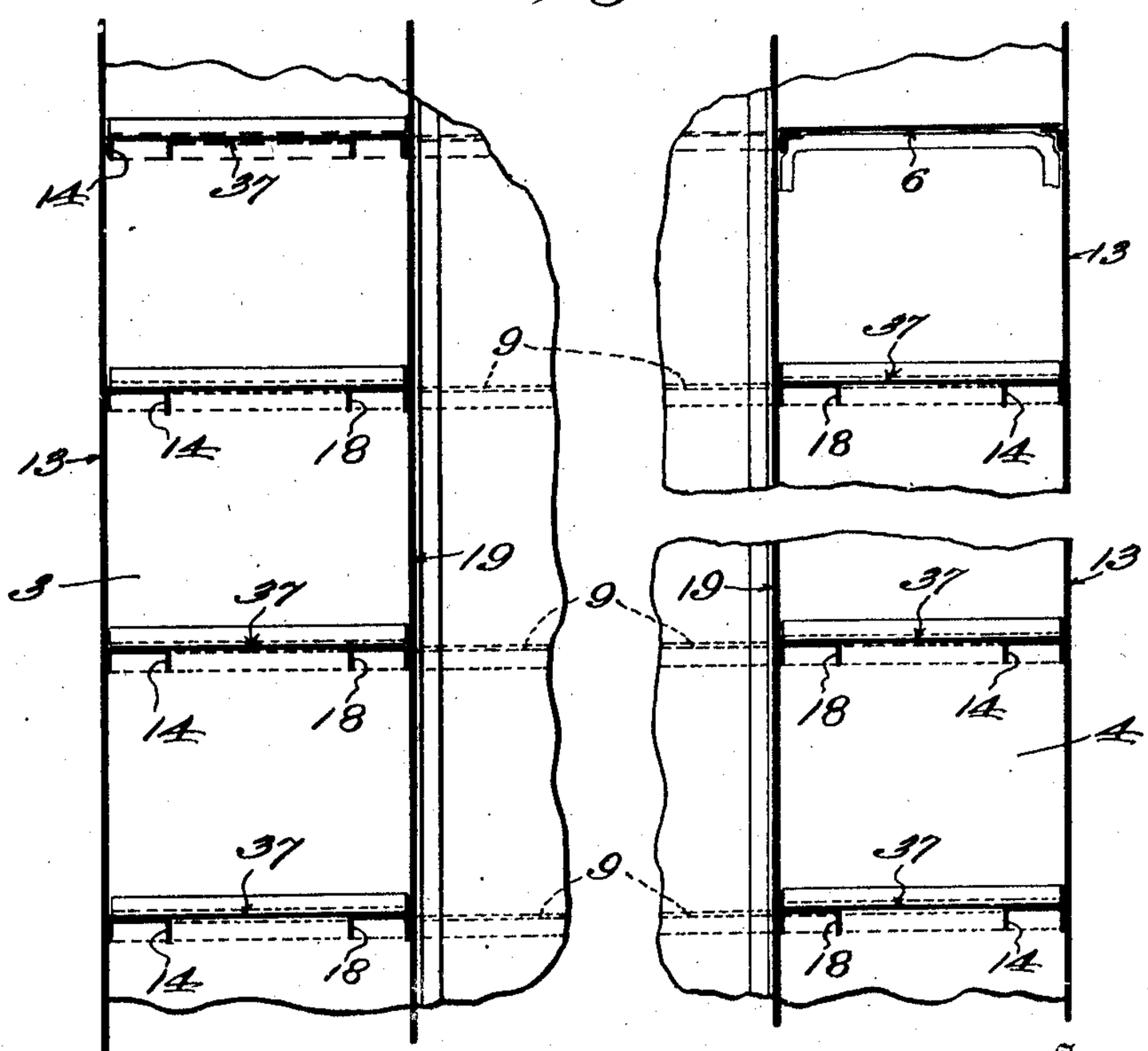

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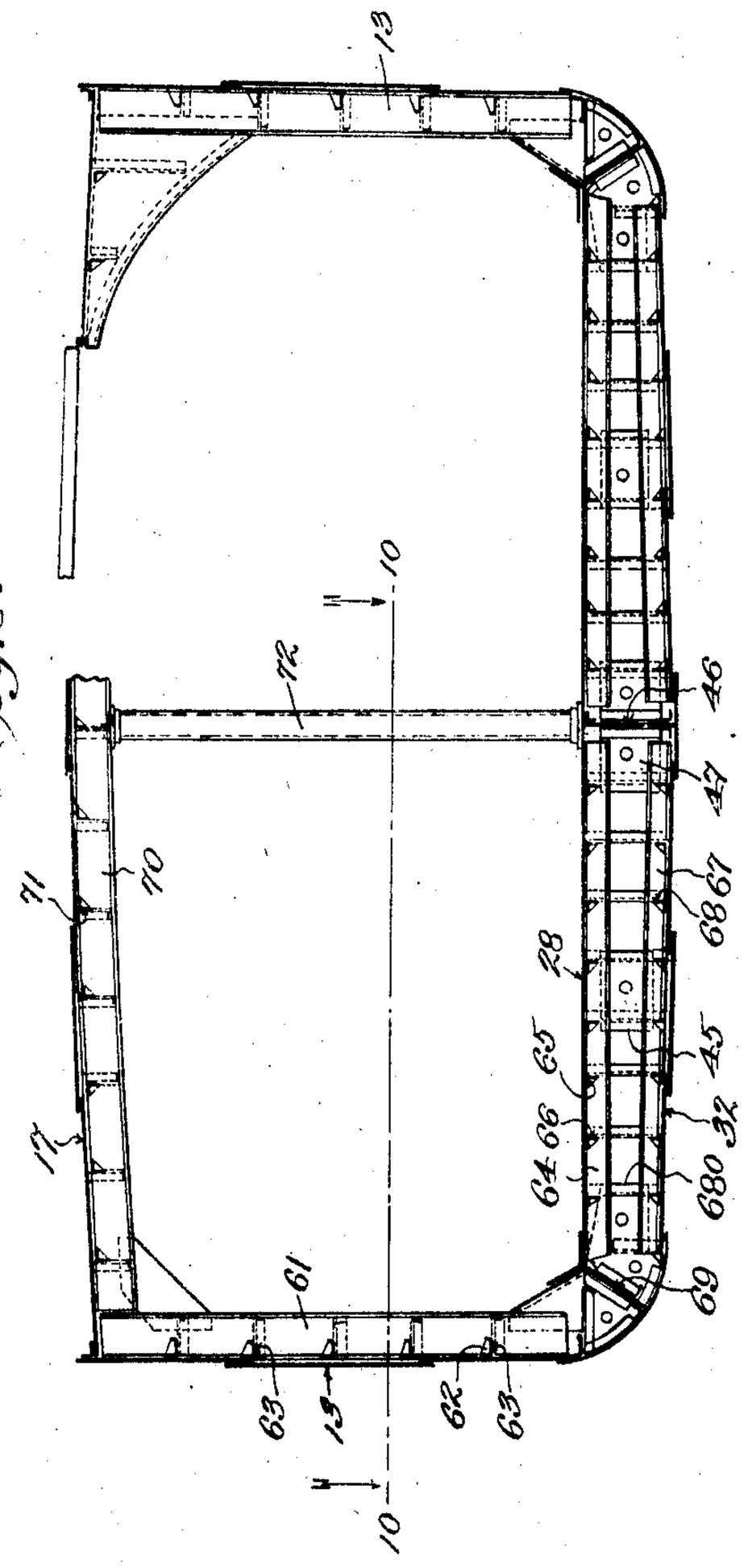
Fig. 9.



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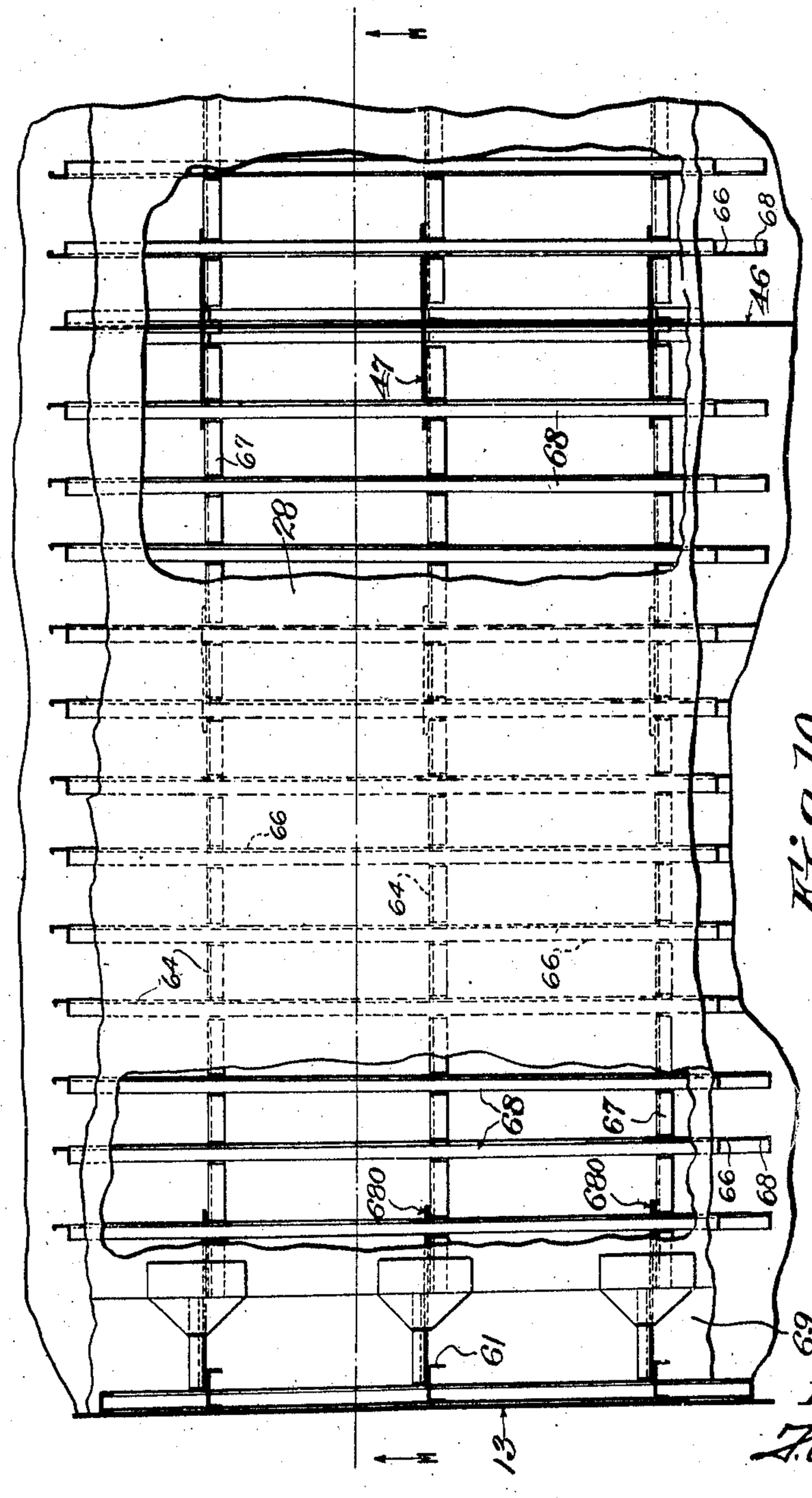

Fig. 10.

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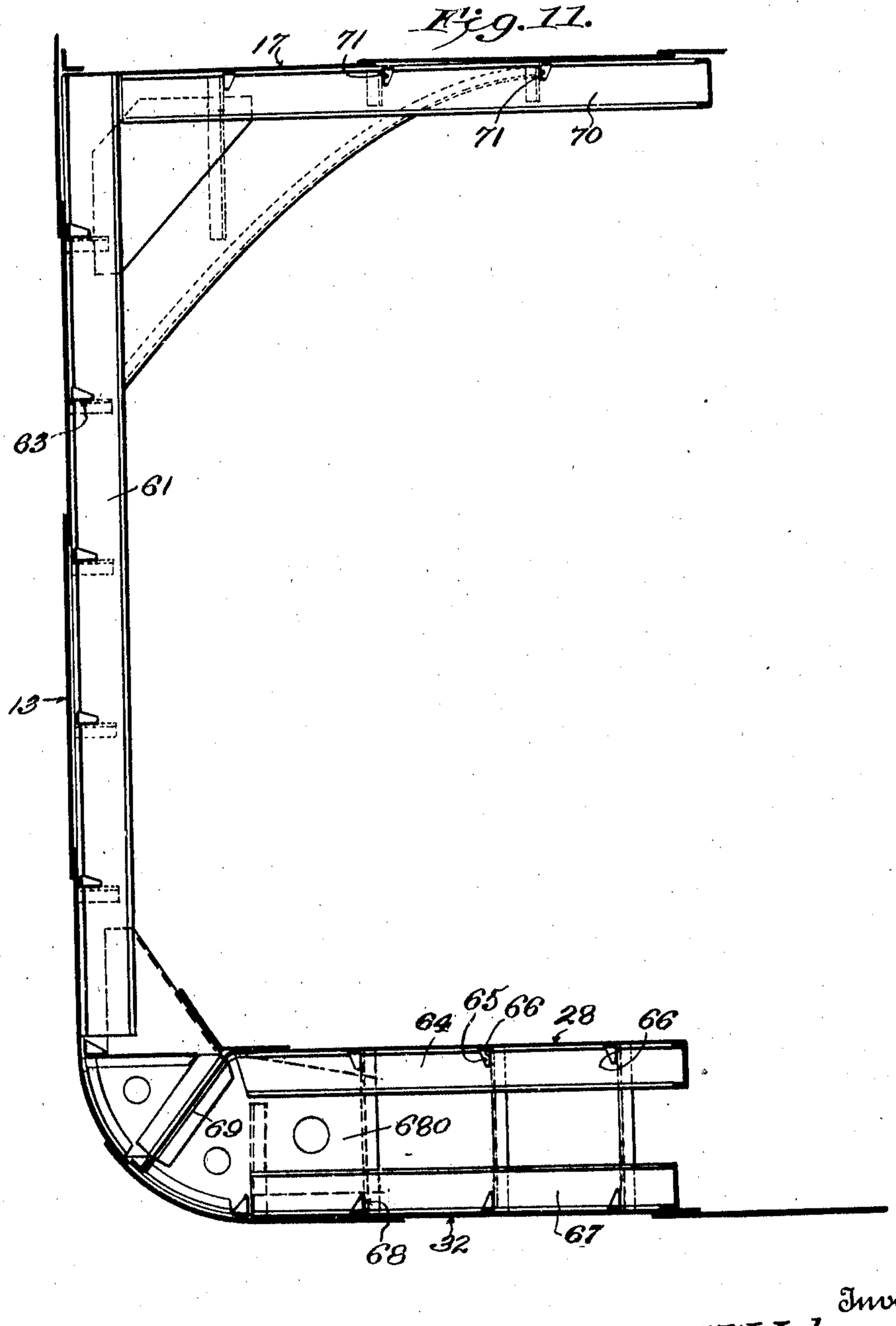
Fig. 11.



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Patented Feb. 7, 1928. 1,658,336

UNITED STATES PATENT OFFICE.

JOSEPH WILLIAM ISHERWOOD, OF CHISLEHURST, ENGLAND.

FLOATING VESSEL.

Application filed October 7, 1924. Serial No. 742,236.

This invention relates to floating vessels and has for one of its objects to so modify the construction disclosed in my prior U. S. Patent No. 1,029,546, dated June 11, 1912, as will enable the builders to use for the transverse materials, channel or other rolled sections of comparatively shallow depth, while retaining the same or greater rigidity in the construction and seaworthiness of the vessel.

A further object of the invention is to so dispose the bracing material in the vessel as to save a very considerable weight of metal thought necessary before the invention described in Patent No. 1,029,546 in vessels of the same strength and seaworthiness.

With these and other objects in view, the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification, in which like numerals designate like parts in all the views;

Figure 1 is a diagrammatic elevational view of a Great Lakes freighter about 600 feet long and embodying the construction of this invention;

Figure 2 is a view similar to Fig. 1 of a somewhat modified form general cargo vessel made in accordance with this invention about 250 feet long and capable of passing through the Welland Canal;

Figure 3 is an enlarged sectional view illustrating a portion of the construction on the port side of the vessel shown in Fig. 1, when the section is taken on the line 3—3 looking in the direction of the arrows;

Figure 4 is a view similar to Fig. 3, of the starboard side of the vessel shown in Fig. 1, the section being taken on the line 4—4 of said figure looking in the direction of the arrows;

Figure 5 is a view taken on the line 5—5 of Fig. 6 looking in the direction of the arrows and showing the side construction;

Figure 6 is a view of the bottom construction partially broken away, taken on the line 6—6 of Fig. 5 looking in the direction of the arrows;

Figure 7 is an enlarged sectional view of the bottom construction immediately adjacent the center keel of the vessel;

Figure 8 is an enlarged sectional view in plan partially broken away of the sides of the vessel, taken on the line 6—6 of Fig. 5;

Figure 9 is a view similar to Fig. 5, of the modified form of vessel shown in Fig. 2;

Figure 10 is a view of the construction shown in Fig. 9, taken on the line 10—10 of said figure looking in the direction of the arrows; and

Figure 11 is an enlarged sectional view of a portion of the construction shown in Figs. 9 and 10.

In order that this invention may be the more clearly understood, it is said:—Referring first to Fig. 1 of the drawings, the Great Lakes freighter there illustrated is provided with two transverse bulkheads 1 and 2, which extend entirely across the ship and are spaced about 144 feet apart. This said vessel also has wing tanks 3 and 4, as best shown in Figs. 3 and 4, which may extend substantially throughout the length of the vessel and each of which is made about 72 feet long having end walls numbered respectively 5 and 6. These said wing tanks, with their transverse end walls 5 and 6, coupled with the transverse bulkheads 1 and 2, form an economical bracing structure which coacts with other bracing structures that will be more fully disclosed below. That is the vessel of Fig. 1 is provided with a plurality of deep transverse frames 7 spaced 24 feet apart and extending down to the tops 8 of the wing tanks 3 and 4, as illustrated. The bottom of the vessel is provided with top transverse channel members 9 and with bottom transverse channel members 10 spaced longitudinally of the vessel 6 feet apart throughout said bottom. It thus results that when this bottom structure is considered in connection with the side or wing tanks 3 and 4, the deep transverses 7, and with the transverse bulkheads 1 and 2, there is provided a plurality of box-like girder structures in the vessel which mutually coact to give a maximum of stiffness with a minimum weight of metal, and that the channel sections are so longitudinally and vertically disposed in these various girders to stiffen the same to a maximum degree with a minimum weight of metal.

For example, in the wing tanks 3 and 4, there are secured to the outer side plating 13 at a distance of 6 feet apart a plurality of vertical channel members 14 located in-

side the tanks 3 and 4, which extend from near the bilge 15 of the vessel up to the tank tops 8, as shown. Above the tank tops 8 and spaced 12 feet apart in the vessel of Fig. 1, are a plurality of similar channel sections 16 which extend from said tank tops 8 up to the deck 17 of the vessel. Inside the tanks 3 and 4 and opposite said transverse channel members 14, are disposed similar channel members 18 in the same transverse plane as are the channel members 14. The inner platings 19 constituting the inner sides of the tanks 3 and 4, are secured to these transverses 18 and all of said transverses 14, 16 and 18 are notched for the passage of longitudinals as shown. That is, through the notches 20, Figs. 3 and 4, of the transverses 14 are passed the longitudinals 21 which are secured to the skin 13 of the vessel, through the notches 22 of the transverses 16 are passed the longitudinals 23; and all the longitudinals 21, 23 and 25, as well as their corresponding transverses 14, 16 and 18, are secured directly to their corresponding plating.

The bottom transverses 9 are in line with the transverses 14 and are likewise notched, as at 26, Figs. 3 and 4, and there are longitudinally disposed angles 27 passed through said notches 26 as shown. These said angles 27 and transverses 9 are secured to the plating 28 of the bottom tank 29. Likewise, the bottom transverses 10 are notched as at 30, and channels or other shapes 31 are passed therethrough and secured to the bottom plating 32, as illustrated.

In the bilges 15 are placed transverse plate-brackets 33 which are likewise notched and longitudinal channels 34 passed therethrough as illustrated. The ends of the transverses 9 and 10 are further secured to the bilge plates 33, as indicated in Figs. 3 and 4. The extensions 35 of the bottom tank top 28 constitutes the bottom of the wing tanks 3 and 4, and fitted to said extensions 35 and to the corresponding transverses 14 and 18, are the vertical stiffening plates 37, as shown. Corresponding vertical stiffening plates 38 are fitted between the transverses 14 and 18 in each tank 3 and 4 and to the tops 8 of the said tanks as illustrated. Brackets 39 are secured between the tank tops 8 and the transverse members 16, which as stated above are fitted between the deep transverses 7, which are spaced 24 feet apart.

As best illustrated in Figs. 5 and 6, there are disposed throughout the bottom of the vessel a plurality of rectangular plates 45 which are secured between the upper channel members 9 and the lower channel members 10 of the bottom. These said plates 45 serve to bind the transverses 9 and 10 securely together, and on each side of the center keel 46 there are disposed and secured somewhat similar plates 47, as illustrated.

On each side of the keel there is disposed the longitudinal girder or plate 50 to which the rectangular plates 45 are conveniently fastened. The plates 50 are preferably fitted continuous, as shown. The deck 17 is of a construction somewhat similar to the bottom and is supported by the deep transverse beams 56 spaced 24 feet apart and rigid with the deep transverses 7. These beams are notched as at 57 to receive the longitudinally disposed channels 58.

It will now be clear that this Great Lakes freighter illustrated in Fig. 1, has its hull structure braced by the transverse bulk heads 1 and 2 Fig. 1, spaced 144 feet apart; by the wing tanks 3 and 4, Figs. 3, 4, 5 and 8 having the transversely disposed ends 5 and 6 spaced 72 feet apart; by the vertically disposed deep transverses 7 spaced 24 feet apart; by the vertically disposed transverses 16 spaced 12 feet apart; and by the vertically disposed transverses 14 and 18 spaced 6 feet apart. In addition to this the bottom is stiffened by the upper transverses 9 and the lower transverses 10, while the deck is provided with the deep transverses 56. This transverse stiffening combines with the longitudinals 21 and 23, with longitudinals 25, with the longitudinals 58, and with the longitudinals 27 and 31 to form a plurality of box-like girders whose strengths are greatly increased by the fact that all the longitudinal and transverse members are directly attached to the shell plating comprising the deck sides and bottom of the vessel. It results that in a vessel of about 600 feet long it is found by this system of bracing and disposition of the parts about 100 tons of metal can be saved over the prior constructions and provide a vessel of the same capacity, strength and seaworthiness.

In the same way a considerable saving of metal can be accomplished by building smaller sized vessels such as those illustrated in Figs. 2, 9, 10 and 11 according to the foregoing disclosure with slight modifications now to be noted.

In discussing said Figures 2, 9, 10 and 11 the same parts are numbered as in the preceding figures, and only the differences in construction over the preceding vessel are stressed.

61 are the transverse frames, which are spaced about half the spacing of the widely spaced deep transverse frames in my said Patent No. 1,029,546. They are of channel sections, 12 inches deep and 31 lbs. per foot and spaced 6 feet apart. These channel frames are notched on their edges at 62 adjoining the skin plating 13 to permit of continuous longitudinal frames 63 preferably of channel, bulb angle or angle section to pass through the said transverse frames. 64 are transverse channels ten inches deep by 23 lbs. per foot spaced 6 feet apart support-

ing the inner bottom plating 28 and are notched at 65 to permit of longitudinal stiffeners 66, 5½ inches deep to pass through said transverse channel. The outer bottom plating 32 is supported by transverse channels 67, 10 inches deep by 23 lbs. per foot and are notched to permit of continuous longitudinal frames 68, 5½ inches deep to pass through said transverse channels. 680 are diaphragm plates whose purpose is to connect the transverse sections to the tank side 69. In the deck construction 70 are the transverse notched channels spaced 6 feet apart and 71 the continuous deck longitudinals.

Should it be specified that a given size and class of ship is to be built according to my said patent above mentioned, or according to the "Isherwood system," ship builders and naval architects throughout the United States and most countries of the world would readily know the dimensions or scantlings of the various parts to be employed, and would therefore have no difficulty in building such a ship, nor in having the ship passed as being seaworthy or safe by any of the standard classification societies.

In other words, the builder would proceed at once to use the various shapes, weights and dimensions of the various parts which have been used and are still used in so many of these "Isherwood ships" that said parts may be said to have been standardized for each size and class of vessel. In fact, the ship itself would be equally well known as having been built on the "Isherwood system" or on "the longitudinal system." Therefore, wherever the words "Isherwood system" or "longitudinal system" occur in the claims, it is to be understood that a construction is referred to in which the parts are so disposed and are of such dimensions as to comply with the well known requirements of a vessel of the same size and class built on a system now in general use and known to the world as the Isherwood system.

Therefore, it will now be clear, that by providing a construction as that above disclosed, in both types of vessel that one may produce ships having the following advantages:—

The transverse materials are formed of channel or other convenient sections instead of web plates and angles as in the Isherwood system, and that they are spaced about half the normal spacing with the longitudinals spaced somewhat further apart than is required by my Patent #1,029,546. This admits of a reduction in depth or size of the longitudinal frames and a material saving in metal. This said structure also provides for a very rigid construction in each class of vessel which will resist damage to the structure when the vessel contacts with concrete dock walls. The bottom construction is simplified in like manner or in other words, transverse members are fitted in the double bottom in line with said members in the side of the ship, and not intermediate transverses in the double bottom. The transverse members, in the double bottom are formed of channels similar to those in side of ship. These channels have notches cut in their edges which contacts with the bottom plating and tank top plating through which pass continuous longitudinals, both the transverses and longitudinal materials being directly attached to the shell and tank top plating. This results in a more rigid bottom construction which is less costly to build and is more readily accessible than the prior constructions involving plate floors having manholes for accessibility.

It will thus be seen that this vessel embodies a construction between the main transverse bulkheads spaced about 144 feet that greatly stiffens the hull at its sides in the said wing tanks, which are stiffened by an intermediate bulkhead about 72 feet apart with intermediate transverses made up of channels and plates in the bottoms and sides in lieu of solid plates. This, together with longitudinals notched through the above channels, of comparatively shallow depth gives greater rigidity of structure and at the same time, in a 600 foot vessel, would save about 100 tons of metal.

What is claimed is:—

1. In a floating vessel the combination of a bottom comprising spaced transverse rolled section members extending substantially from the sides to mid-beam associated with longitudinally disposed rolled section members; side members comprising vertically disposed rolled section members associated with longitudinally disposed rolled section members, said side members being rigidly connected with said bottom members, and a deck comprising deep transverse frame members associated with longitudinally disposed rolled section members and rigidly connected with said side members, and a side tank composed of rolled section members comprising transverse members associated with longitudinally disposed rolled section members, said transverse members being more closely spaced than in the Isherwood system and more widely spaced than in the ordinary transverse system, whereby the ship involves greater local rigidity and simplicity of construction than in either the Isherwood system or the ordinary systems.

2. A floating vessel provided with main transverse bulkheads spaced more than 72 feet apart serving to stiffen the hull, and also provided between said bulkheads in its deck and bottom portions with a plurality of pairs of transverse members composed of

rolled sections having notches, said transverse members extending substantially from the sides to mid-beam and being somewhat more closely spaced and individually lighter than in the Isherwood system; said vessel also provided in said deck and bottom portions with longitudinally disposed members passing through said notches and more widely spaced than in said system, and with longitudinally disposed wing tanks on its sides; whereby there is produced a vessel with increased rigidity, of a less weight of metal, and of a greater simplicity of construction than in said system.

3. A floating vessel provided with main transverse bulkheads, spaced substantially twelve times the spacing of each pair of transverse members, serving to stiffen the hull, and also provide between said bulkheads in its deck and bottom portions with a plurality of pairs of transverse members composed of rolled sections having notches, said transverse members extending substantially from the sides to mid-beam and being somewhat more closely spaced and individually lighter than in the Isherwood system; said vessel also provided in said deck and bottom portions with longitudinally disposed members passing through said notches and more widely spaced than in said system; and with longitudinally disposed wing tanks on its sides; whereby there is produced a vessel with increased rigidity, of a less weight of metal, and of a greater simplicity of construction than in said system.

4. A floating vessel provided with main transverse bulkheads spaced substantially seventy-two feet apart serving to stiffen the hull, and also provided between said bulkheads in its deck and bottom portions with a plurality of pairs of transverse members composed of rolled sections having notches, said transverse members extending substantially from the sides to mid-beam and being somewhat more closely spaced and individually lighter than in the Isherwood system; said vessel also provided in said deck and bottom portions with longitudinally disposed members passing through said notches and more widely spaced than in said system and with longitudinally disposed wing tanks on its sides; whereby there is produced a vessel with increased rigidity, of a less weight of metal, and of a greater simplicity of construction than in said system.

In testimony whereof I affix my signature.

JOSEPH WILLIAM ISHERWOOD.