

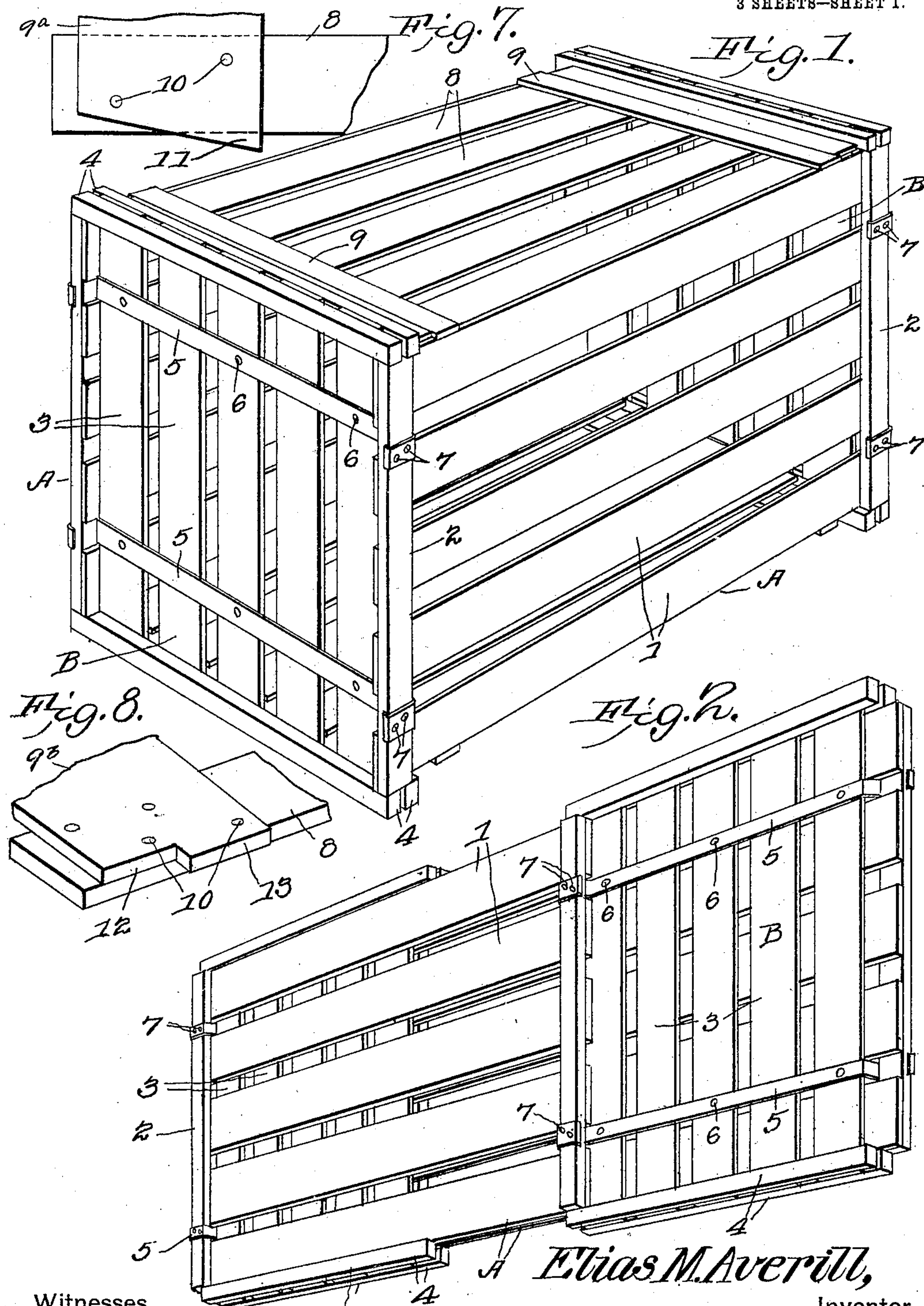
No. 832,525.

PATENTED OCT. 2, 1906.

E. M. AVERILL.
FOLDABLE CRATE.

APPLICATION FILED AUG. 25, 1906.

3 SHEETS—SHEET 1.



Witnesses
E. J. Stewart
H. A. Shepard

Elias M. Averill,
Inventor
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Attorneys

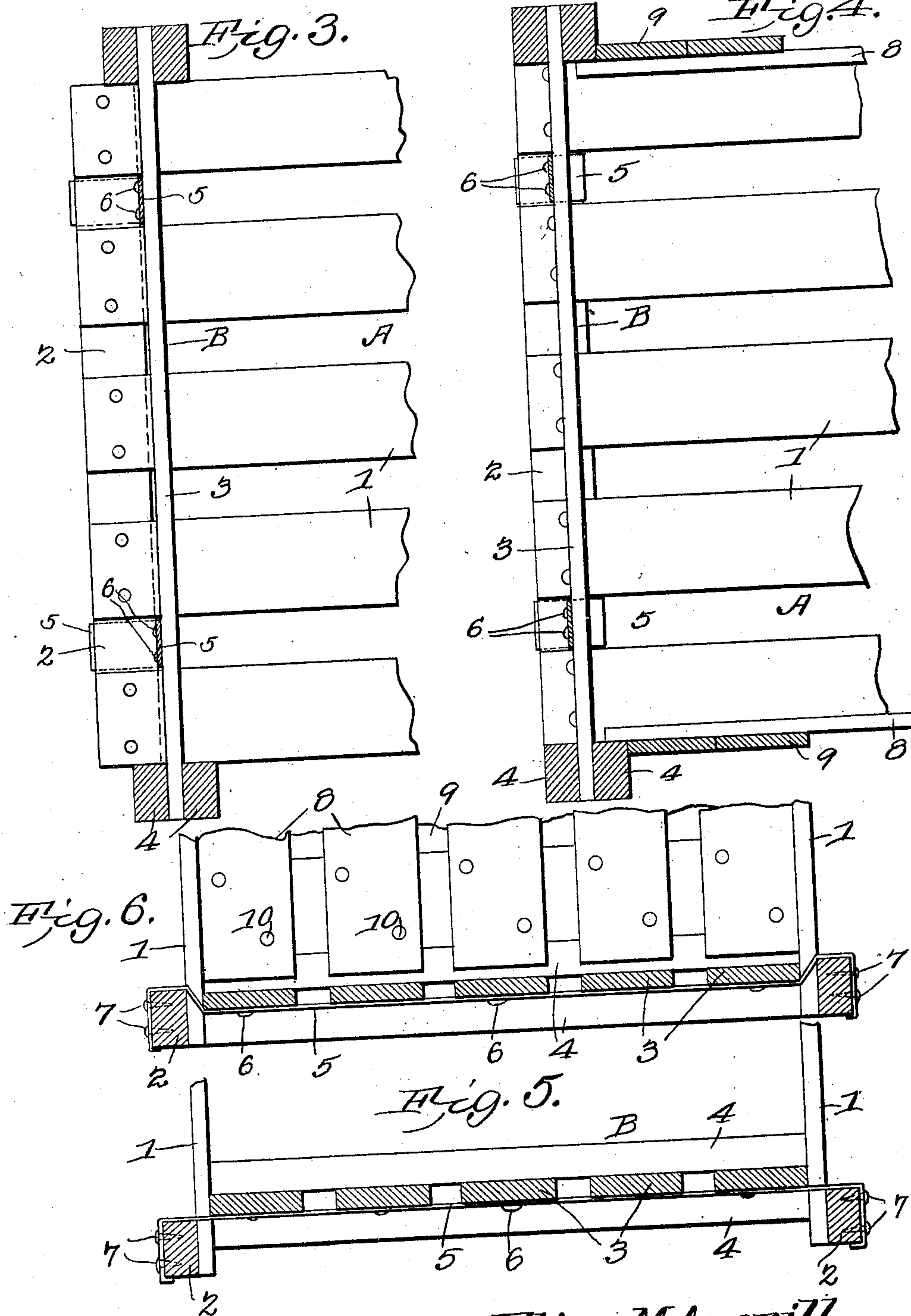
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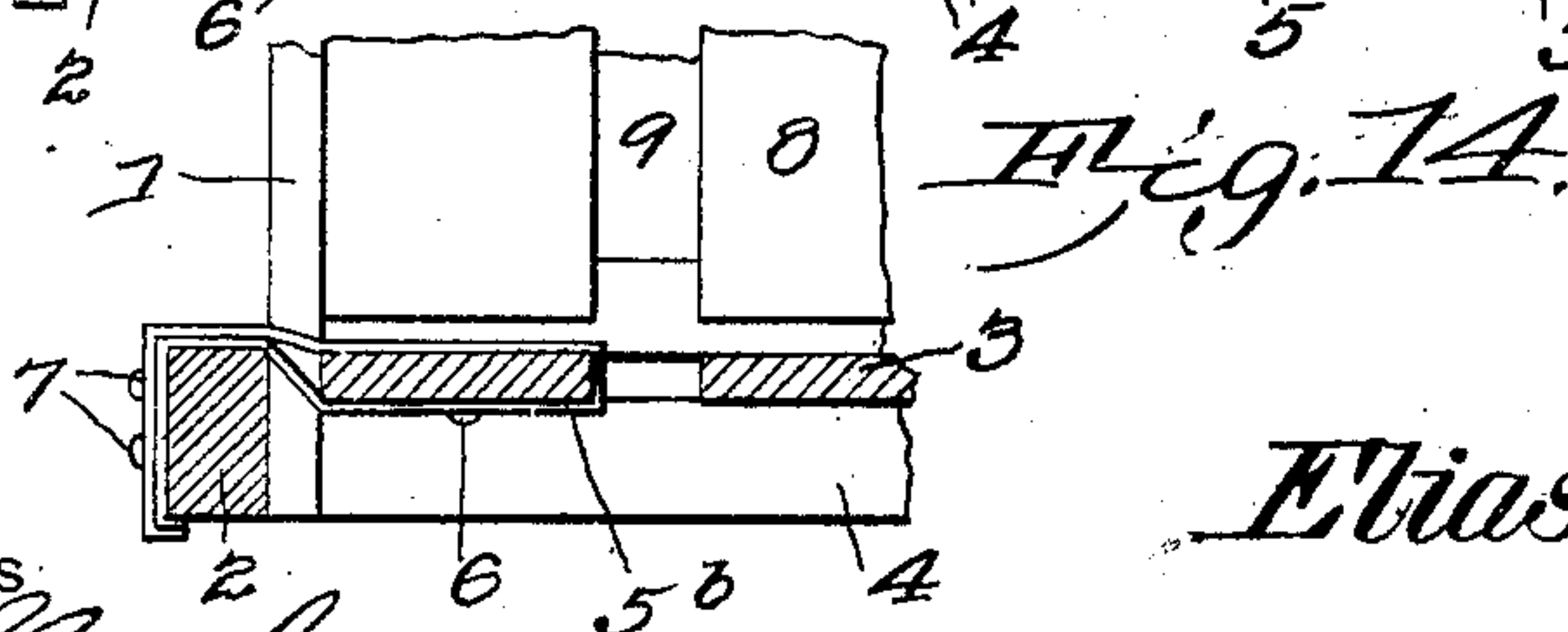
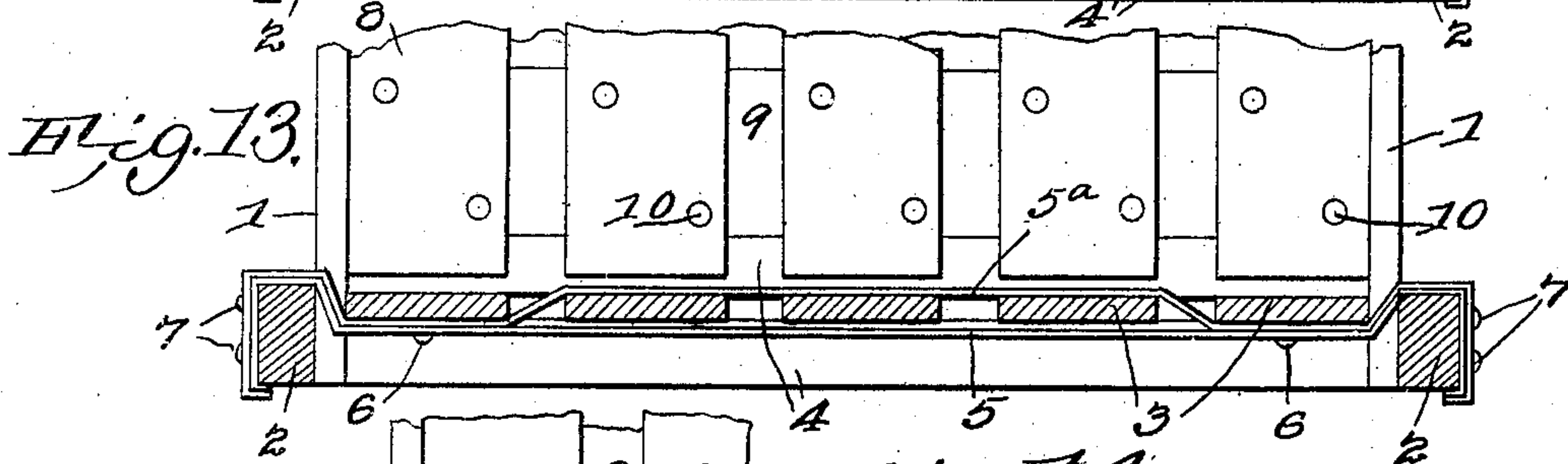
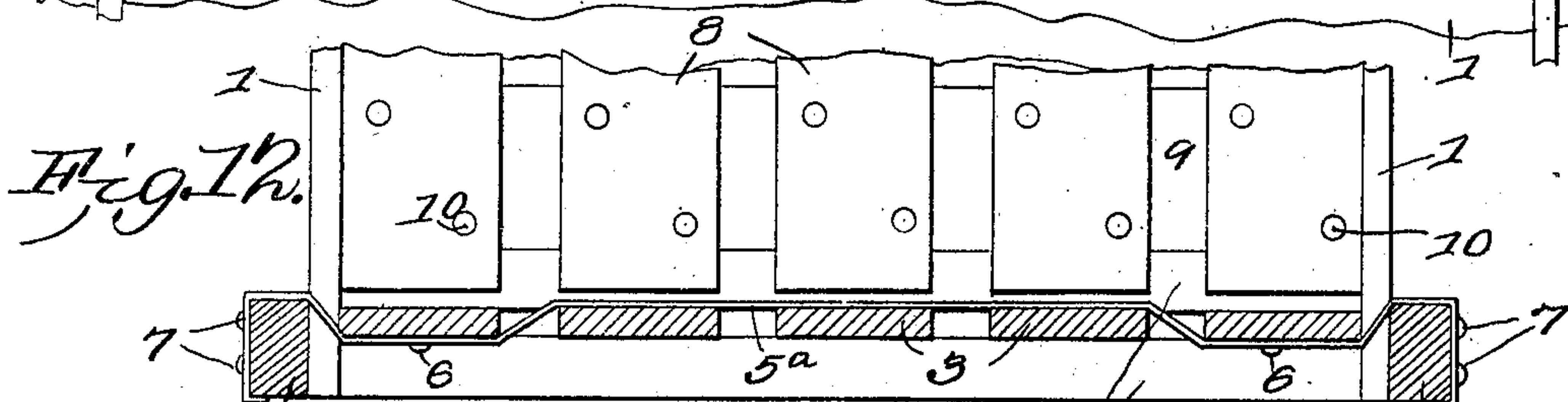
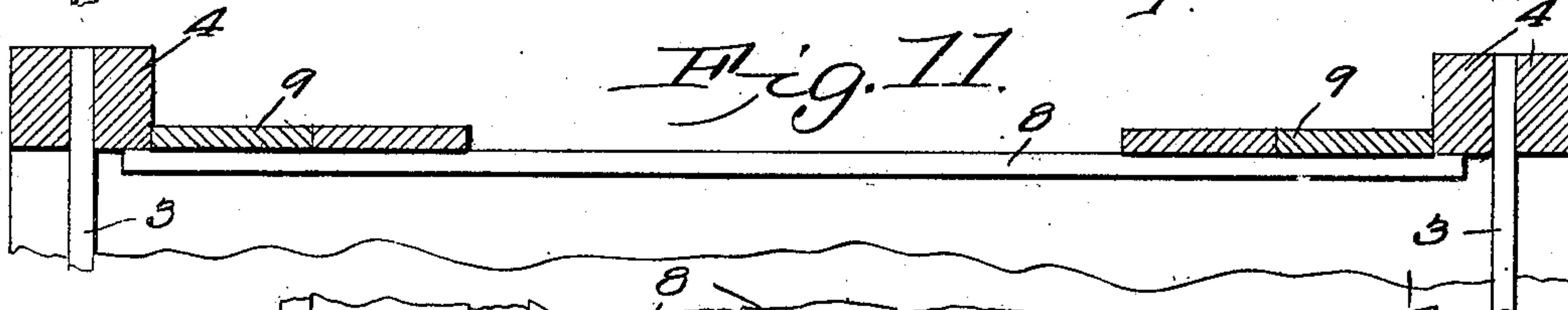
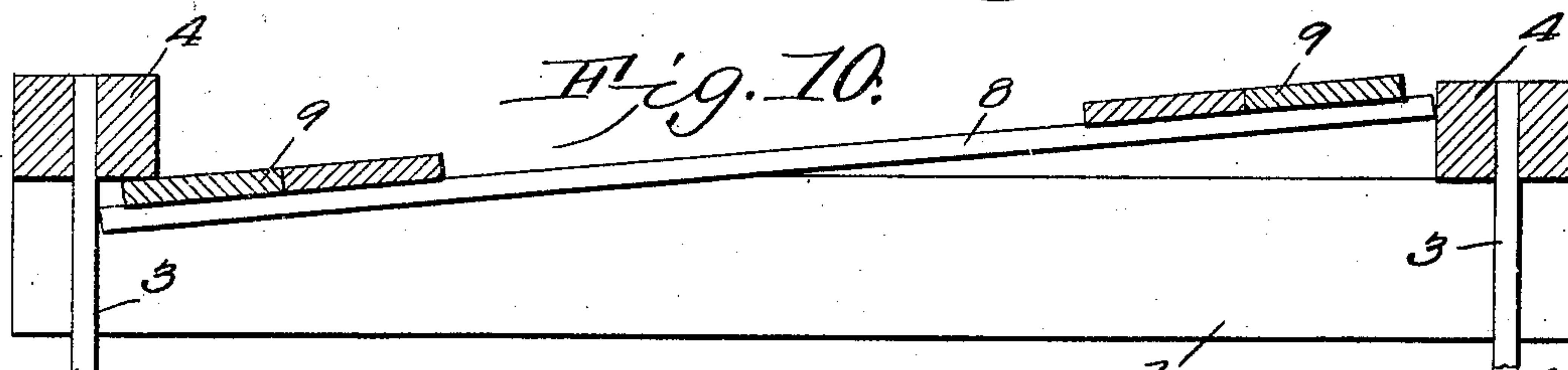
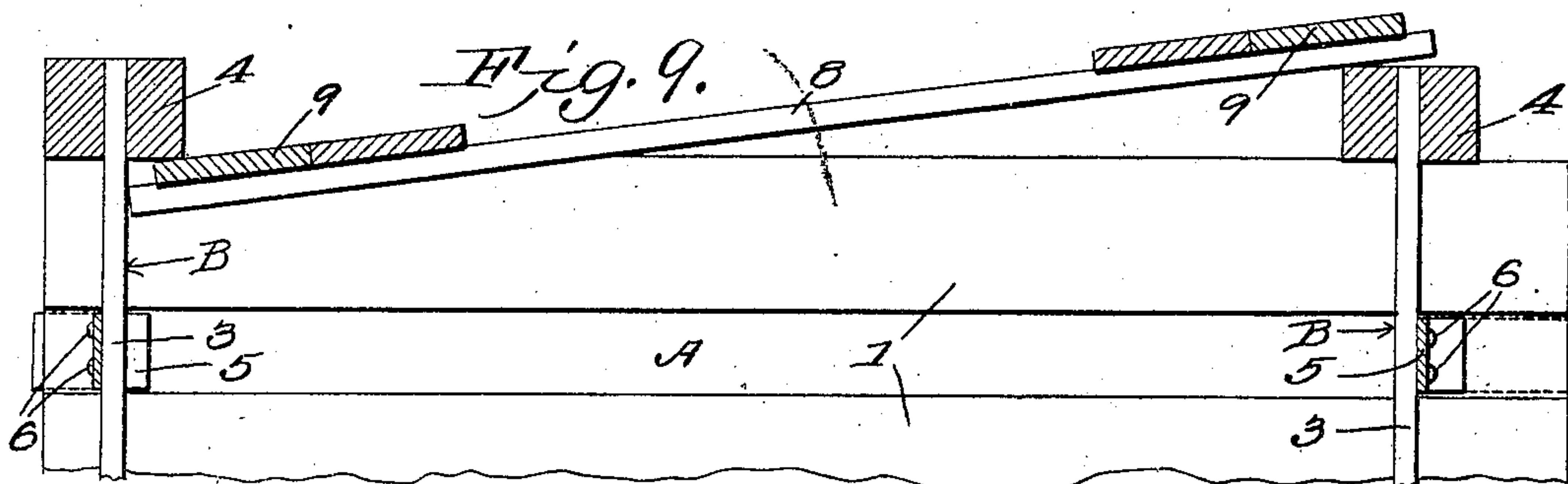
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UNITED STATES PATENT OFFICE.

ELIAS M. AVERILL, OF NEWAYGO, MICHIGAN.

FOLDABLE CRATE.

No. 832,525.

Specification of Letters Patent.

Patented Oct. 2, 1906.

Application filed August 25, 1905. Serial No. 275,829.

To all whom it may concern:

Be it known that I, ELIAS M. AVERILL, a citizen of the United States, residing at Newaygo, in the county of Newaygo and State of Michigan, have invented a new and useful Foldable Crate, of which the following is a specification.

This invention relates to packing and storing vessels, and is designed to provide an improved foldable or collapsible device of this character wherein opposite ends and two sides of the device are permanently connected and the other sides are removable to enable the convenient folding of the receptacle when not in use.

It is a further object of the invention to so construct a receptacle as to effect a binding of the parts thereof when the removable sides are fitted in place with such a degree of tension as to hold the removable sides rigidly in place against accidental displacement.

Another object of the invention is to provide a novel construction of removable sides to enable the convenient assemblage thereof with the permanent sides and ends of the receptacle.

The invention is primarily intended as a shipping-crate and may be a slatted or ventilated crate or a closed crate, as desired.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a perspective view of a plate of the present invention in its set-up condition. Fig. 2 is a perspective view showing the crate folded. Fig. 3 is a vertical sectional view taken through one end of the crate before assembling the removable sides. Fig. 4 is a similar view showing the opposite removable sides in place. Fig. 5 is a horizontal sectional view taken through one end of the crate before the application of the removable sides. Fig. 6 is a similar view showing the position of the end of the crate when the removable sides are fitted in place.

Figs. 7 and 8 are detail fragmentary views of modified forms of removable sides. Figs. 9, 10, and 11 are fragmentary vertical sectional views illustrating the three successive steps in assembling one of the removable sides of the crate. Figs. 12, 13, and 14 are fragmentary sectional views taken transversely through one end of the crate and showing modifications in the arrangement of the bendable metallic bands.

Like characters of reference designate corresponding parts in each and every figure of the drawings.

The body of the present crate includes opposite duplicate permanent sides, (designated in general A,) and opposite duplicate permanent ends, (designated B,) which may be of slatted formation to produce a ventilated crate, or they may be solid or blank members when a closed crate is desired. For a ventilated crate each permanent side is made up of a series of spaced slats 1, which are connected at each end of the side by an external cross-bar or cleat 2, to which the slats are nailed or otherwise permanently connected.

Each end of the ventilated crate is made up of vertically-disposed slats 3, which are embraced between pairs of end cleats 4, to which the slats are nailed or otherwise connected, the cleats being extended beyond the upright edges of the end, so as to overlap the adjacent edges of the permanent sides of the crate to brace the same, and thereby strengthen the entire crate.

Across the upper face of each end of the crate there is a flexible metallic band 5, which is permanently connected to the end member by means of suitable fastenings 6, the ends of the band being extended beyond opposite upright edges of the end member of the crate and passed between a pair of slats of the adjacent permanent side of the crate, the extremity of each end of the band, as best indicated in Figs. 5 and 6, being folded around the outer face of the adjacent cleat or cross-bar 2 and permanently secured thereto by means of suitable fastenings 7. There are two or more of these flexible metallic bands 5, and they may be in the nature of flat bands or straps, as shown in the drawings, or in the nature of round bars or wires, as may be desired. When the crate is formed with blank or solid sides, it is of course necessary to form

openings through the sides of the crate for the reception of the bands 5.

It will here be explained that the crate is placed upon the market in the condition indicated in Fig. 5 of the drawings, each end of the crate being permanently connected to the permanent sides by the flexible bands 5 and located inwardly from the adjacent ends of said sides, the end portions of the bands between the ends of the crate and the permanent sides thereof constituting hinges whereby the crate may be collapsed or folded, as indicated in Fig. 2 of the drawings, for convenience in transportation and storage.

Each removable side of the crate is made up of slats 8, connected by means of terminal cross-bars 9, located inwardly from the respective ends of the side in order that the terminals of the slats may project slightly beyond the cleats or cross-bars. Each cleat or cross-bar is upon the outer face of the side and is permanently connected thereto by suitable fastenings 10. The width of each removable side is proportioned to fit snugly between the permanent sides, and each end cleat is projected beyond opposite edges of the removable side, so as to form stop-shoulders for engagement with the adjacent edges of the permanent sides when either end of the removable side is introduced into the open side of the crate adjacent one end thereof, so as to engage the projected terminal of the removable side beneath the adjacent cleat 4 of one of the permanent ends of the crate. The purpose of these stop-shoulders is to prevent the removable side from dropping down into the crate and to support the removable side upon the edges of the permanent sides in such a position as to guide the end of the removable side beneath one of the cleats of one of the ends of the crate.

For an understanding of the manner of fitting one of the removable sides in place reference is had more particularly to Figs. 9, 10, and 11. Fig. 9 illustrates the initial step in the assemblage of one of the removable sides, from which it will be understood that not only the extremities of the slats, but also the outer end portion of the cross-bar, is introduced beneath the inner cleat 4 of the adjacent end of the crate, the side being pushed endwise until the ends of its slats engage the slats of the crate end. During this operation the projected end portions of the cleats bear upon the top edge of the permanent sides of the crate, so as to prevent the removable side dropping down into the bottom of the crate. During the engagement of one end of the removable side with the adjacent crate end the opposite end of the removable side of course rests upon the other crate end. After the removable side has been applied as shown in Fig. 9 the other end of the crate is forced outwardly until the removable side is free

from the crate end, as indicated in Fig. 10, whereupon the removable side will drop down until the projected ends of the cleat strike the top edges of the permanent sides of the crate, and then the removable side will be moved endwise, so as to withdraw its first-mentioned cleat from beneath the inner cleat or cross-bar of the first-mentioned end of the crate until the side assumes the position shown in Fig. 11 with its cleats bearing against the inner cleats of the crate ends and the ends of its slats engaging beneath the inner cleats of the crate ends.

It will here be explained that each cleat of the removable side is disposed inwardly from the adjacent end of the side one-half of the thickness of the inner cleat of the crate end, and the length of the removable side is less by the thickness of the inner cleat of the crate end than the length of the space between the crate ends when the removable side is fitted in place.

It will here be explained that the loose portions of the bands 5 between the crate ends and the permanent sides of the crate yield sufficiently to permit of the crate ends being forced outwardly from the position indicated in Figs. 3 and 5 to the position indicated in Figs. 4 and 6 by the application of the removable sides of the crate, the tendency of these bent portions of the bands to return to their original positions being sufficient to produce a relatively high degree of tension or pressure upon all parts of the crate, so as to hold the removable sides in place against accidental displacement without the employment of extraneous fastening means.

From the foregoing description it will be understood that at no time are the ends of the crate separated to a greater extent than when the removable sides are in place, wherefore there is no undue bending or stretching of the bands, and therefore the most effective binding of the ends of the crate upon the ends of the removable sides is obtained.

To remove one of the removable sides, either end thereof is forced downwardly into the crate sufficiently to bring the adjacent cleat of the removable side beneath the inner cross-bar or cleat of the adjacent crate end, whereupon the removable side may be moved endwise to free the opposite end thereof from the inner cleat or cross-bar of the other crate end, and then the removable side may be lifted from the crate.

It will here be explained that the projected end portions of the cleats of the removable sides have sufficient elasticity to permit of the depressing of either end of the removable side to enable the removing thereof, as just described.

As exhibited in Fig. 1 of the drawings, the terminal stop-shoulders for each cleat 9 may be produced by forming the cleat of two lon-

itudinal members with the inner member longer than the outer member, whereby its terminals form the desired shoulders or projections.

5 In Fig. 7 the cleat 9^a has each end cut obliquely, so as to incline outwardly from the outer to the inner edge of the cleat, and thereby form a projection 11 to rest upon the adjacent edge of a permanent side of the crate.

10 The form of cleat shown at 9^b in Fig. 8 consists of a single bar which is terminally notched, as at 12, so as to produce a projecting portion 13, which constitutes a shoulder for engagement with the edge of one of the
15 permanent sides of the crate.

In each form of cross-bar or cleat for the removable sides it will be noted that its outer end portions do not project beyond the edges of the side in order that said side may be
20 passed inwardly between the permanent sides of the crate for a suitable distance until stopped by the terminal shoulders of the cleats and then pushed beneath the cleat of the crate end.

25 Instead of having each metal band passed across the entire outside width of the crate end it may be weaved back and forth between the slats of the crate end, as shown at 5^a in Fig. 12 of the drawings, wherein the band
30 passes across the outer faces of the opposite outermost slats and across the inner faces of the remaining slats; but it will of course be understood that it may be passed alternately across the inner and outer faces of the slats,
35 if so desired.

In Fig. 13 the bands have been shown in pairs with the band 5 passing across the extreme outside width of the crate end and the band 5^a arranged as in Fig. 12, this arrangement being employed where great strength is
40 desired.

Still another embodiment has been shown in Fig. 14, wherein instead of having the band extend entirely across the crate end
45 and terminally connected to the permanent sides I employ a looped band 5^b for each side, said band embracing the adjacent end slat with its ends passed around and fastened to the adjacent end cleat of the permanent side,
50 as in the other forms of the invention.

While I have shown two bands for each end of the crate I contemplate using a single band located midway between the ends of the slats, in which event the removable sides
55 should be longer than illustrated in Figs. 9, 10, and 11 in order that the ends of the crate may be sprung or forced outwardly upon the centrally-located band as a support, so as to have sufficient tension to hold the removable
60 sides in place.

Having thus described the invention, what is claimed is—

1. A crate comprising opposite ends, two opposite permanent sides, and bendable

bands secured transversely across the crate 65 ends and projecting beyond opposite edges thereof with their terminals connected to the sides of the crate, each side of the crate exceeding in length the initial distance between the crate ends, and opposite removable sides 70 exceeding in length the initial distance between the crate ends and capable of being forced in between the latter, the bendable bands permitting of the ends being forced outwardly by the insertion of the removable 75 sides.

2. A crate comprising opposite ends, two opposite slatted sides having terminal cross-bars connecting the slats, bendable bands secured transversely across the crate ends with 80 their extremities passed between pairs of slats and connected to the respective cleats of the permanent sides, and removable sides exceeding in length the initial distance between the crate ends and capable of being 85 forced in between the latter, the bendable bands permitting of the ends being forced outwardly by the insertion of the removable sides.

3. A crate comprising permanent ends having terminal inner cleats, two permanent 90 slatted sides provided with terminal external cleats, bendable bands secured across the crate ends with their extremities projected between pairs of slats and connected to re- 95 spective cleats of the permanent sides, and two opposite removable sides, each removable side exceeding in length the initial distance between the crate ends and provided with terminal cleats located inwardly from 100 the respective ends of the sides and having stop-shoulders projecting beyond opposite edges of the side, each removable side capable of being forced in between the crate ends with its cleats engaging the inner faces of the 105 cleats of the ends and their extremities engaging beneath the cleats of the ends, the bendable band connections between the crate ends and the permanent crate sides permitting of the ends being forced outwardly 110 by the insertion of the removable sides.

4. A crate comprising two opposite permanent sides, opposite permanent crate ends disposed between the sides and initially located inwardly from the respective ends 115 thereof, terminal inner cleats upon the crate ends, hinges connecting the crate ends to the permanent sides, opposite removable sides, each side exceeding the length of the initial space between the crate ends and capable of 120 being forced in between the latter, the hinges being yieldable to permit the crate ends being forced outwardly by the insertion of the removable sides, and terminal cleats carried by the outer faces of the removable sides and 125 located inwardly from the respective ends of said sides a distance equal to substantially one-half of the thickness of one of the cleats

of the crate ends, each side cleat being provided with opposite terminal projections extending outwardly beyond the edges of the removable side to engage across the adjacent
5 edges of the permanent sides and limit the insertion of the removable side between the permanent sides.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ELIAS M. AVERILL.

Witnesses:

FLORENCE LINDSAY,
B. HAMMOND.