T. J. FLOREY.

DOVETAIL JOINT.

APPLICATION FILED NOV. 25, 1910.

1,067,910. **Patented July 22, 1913.**

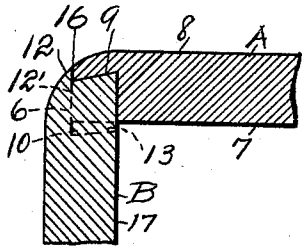

Fig. 2.

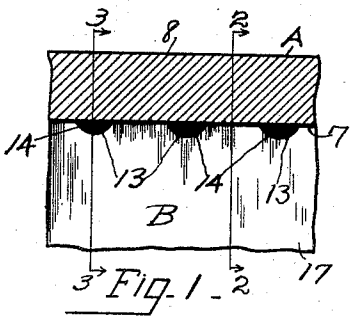

Fig. 1.

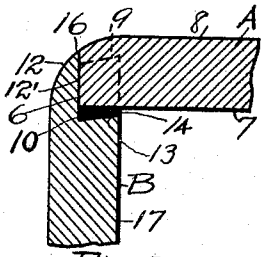

Fig. 3.

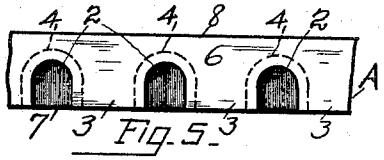

Fig. 5.

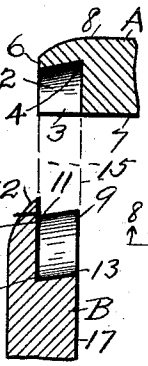

Fig. 4.

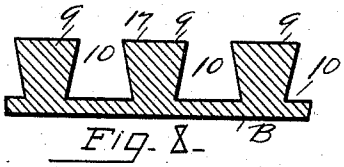

Fig. 8.

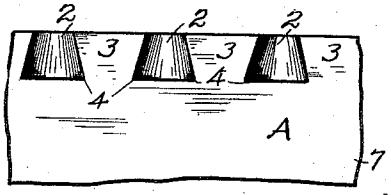

Fig. 6.

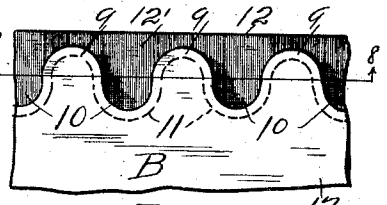

Fig. 7.

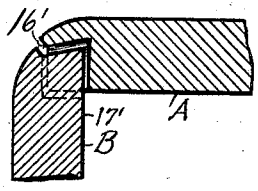

Fig. 9.

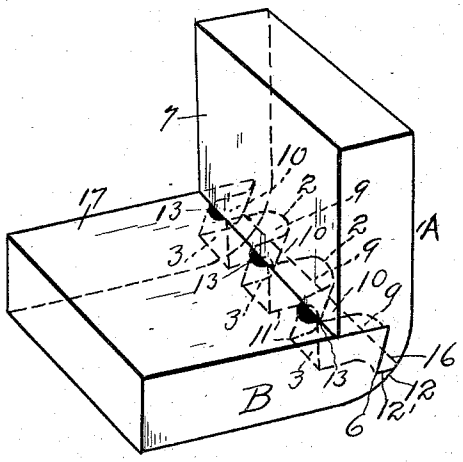

Fig. 10.

WITNESSES:
Chas. H. Hughes.
R. L. Wallace

INVENTOR.
TILGHMAN J. FLOREY
BY Harry DeWallace
ATTORNEY.

UNITED STATES PATENT OFFICE.

TILGHMAN J. FLOREY, OF WASHINGTON, NEW JERSEY, ASSIGNOR TO AMERICAN SANITARY WORKS, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

DOVETAIL JOINT.

1,067,910. Specification of Letters Patent. Patented July 22, 1913.

Application filed November 25, 1910. Serial No. 594,031.

To all whom it may concern:

Be it known that I, TILGHMAN J. FLOREY, a citizen of the United States, residing at Washington, in the county of Warren and State of New Jersey, have invented certain new and useful Improvements in Dovetail Joints, of which the following is a specification.

This invention relates to improvements in dove-tail joints, and the invention relates particularly to the class of joints known as blind or concealed dove-tail, designed for use in connection with household, office and sanitary furniture or work.

The features and parts of my invention will be readily understood from the detail description which follows and by reference to the accompanying drawing, in which—

Figure 1 is a view partly in section and partly in elevation representing a portion of a wooden flush tank; showing the parts united by means of the dove-tail, also showing the method of applying the insulation. Fig. 2 is a sectional view taken on line 2—2 of Fig. 1. Fig. 3 is a sectional view taken on line 3—3 of Fig. 1. Fig. 4 is a sectional view; showing the parts detached ready for assembling. Fig. 5 is an end view of one of the parts of Fig. 4. Fig. 6 is a face view of the same part. Fig. 7 is a face view of the other part of Fig. 4. Fig. 8 is a sectional view taken on line 8—8 of Fig. 7. Fig. 9 is a detail view, showing a slight disjointing of the parts, as by expansion of the wood when affected by moisture. Fig. 10 is a transparent perspective view showing the construction and also interlocking features of the joint.

The object of this invention is to provide a novel, simple and effective dove-tail joint, especially adapted for securing the sections or parts of water closet flush-tanks, and other wooden articles which are constantly subjected to moisture, either atmospheric, or from actual contact with water.

One of the characteristics of wood is to absorb moisture, and another is for the grain of the wood to swell or expand when it becomes damp or wet. When dry wood is exposed to moisture it draws the latter into its pores and the fibers soon begin to swell, which causes expansion of the affected part. During the progress of this expansion of a piece of wood, a powerful force is exerted laterally in all directions, and the expansion generally shows itself in the increasing of the thickness rather than the length of the wooden part.

In the case of flush-tanks, the greatest danger from moisture comes from within the tank, which generally contains a considerable body of water. The water is constantly evaporating and charging the atmosphere with moisture, which affects the whole inner and outer surfaces of the tank, and also attacks the joints and causes them to gape open or otherwise become distorted, unless the joints are properly constructed and suitably prepared to resist the dampness. The present invention is intended to overcome all these difficulties, and to this end, my invention consists of the features and parts which I will now describe.

In the drawings, A and B indicate sections of wood representing respectively, portions of one side and one end of a water closet flush-tank, each of which is correspondingly cut-away, or mortised and tenoned along the adjacent edges in a manner to permit the parts to be joined and interlocked for making a strong, and at the same time, a neat, close and durable joint of the class, commonly known as blind or concealed dove-tail.

In preparing the wood for joining, the edges and the inner face of section A are provided with a series of peculiar shaped mortises 2, which are exactly alike, and are arranged between and alternate with a like series of tenons 3. The mortises 2, as they appear in the end view, Fig. 5, have the outline of a horseshoe, and each is under-cut or beveled inwardly to the extent indicated by line 4 in Fig. 4, and by the dotted lines 4 in Fig. 5. The beveling of the mortises 2, gives to the tenons 3, the angular appearance shown in Fig. 6. The mortises 2 gradually expand or increase in width as they sink into the end of the section A. The face edge, as 6, of this section, which includes the ends of tenons 3, is preferably cut truly at right angles to the inner surface 7 of the said section. All of the mortises 2 are intended to be of the same length, breadth and depth, and are so arranged that one-eighth of an inch or more of solid wood intervene between the arches of the mortises and the external surface 8 of the section A, (see Figs 4 and 5), and by reference to Fig. 5 of the drawing it will be observed

that the dotted lines 4 indicate that the under cut or bevel extends inwardly toward the surface or face 8. Section B, on the other hand, is provided with a number of like tenons 9, which alternate regularly with mortises 10, both of which are under-cut or beveled, as indicated by the dotted lines 11, as best seen in Fig. 7, said undercut or bevel extending inwardly toward the face of the board 17 as indicated in said figure. The out-line of the tenons 9 and mortises 10, as well, as the dotted lines 11, is a regular serpentine, and the points of the tenons 9 conform exactly to the curved bottoms 4 of the section A. In cross-section, (see Fig. 8) the tenons 9 of section B appear angular and correspond exactly to the mortises 2 of section A, and the two sections when joined interfit so as to produce a close and powerful interlocking dove-tail joint. When the parts A and B are joined together by the interfitting of the mortises 2 and the tenons 4, they form a closely joined and rigid angular part, as shown in Figs. 1, 2, 3 and 10.

The peculiar form of the mortises 2 and 10 and of the tenons 3 and 4, insures the effective interlocking of the sections when they are properly prepared and assembled. For blind or concealed joints of the class, greater care must be exercised for effecting the interlocking of the mortises and tenons, since these only extend part way through the wood sections. For that reason the mortises and tenons are both under-cut or beveled, in the manner shown in the drawing, for preventing the sections from being forced apart when subjected to strain, except only when they are moved in one direction, as indicated by the dotted lines 15 in Fig. 4. When the parts are assembled as shown in Figs. 1, 2, 3 and 10, it is impossible to separate them, or to move them even to the slightest extent by exerting a pull or strain in the direction of the length or width of the part A. To aid in preventing the gaping or opening of the joint at the point designated by the numeral 16, which is the only part of the joint that shows on the outer surface of the tank, I provide the flange 12, which projects beyond the point of tenons 4, and extends the full length of the edge of part B, and which is arranged to receive and over-lap the unbroken end surface 6 of part A. The inner face 12′ of the flange 12 and also the bottoms of the mortises 10 are preferably made flat in the same plane, and arranged exactly parallel to the inner surface 17 of part B, so that the parts A and B, when joined together, are brought and held truly at right angles to each other, and the joints will be close and perfect, as shown in Figs. 2 and 3.

The mortises 10 of section B are cut deeper, or rather extend a slight distance farther from the outer edge of flange 12, than the thickness of section A, as shown in Figs. 1 and 3. This extra space 13, is provided so as to allow the wood, in case it expands, to crowd or run into the said spaces for lessening the strain upon the joint. After the parts A and B are put together the openings 13 are filled with melted paraffin, as 14, for forming an insulation which owing to the nature of the wax, insures the exclusion of moisture from the interior of the joint. Immediately after the paraffin is poured into the cavities 13, it becomes set, and in addition to acting as an insulation, it also serves to stiffen the joint and bind the two sections together.

The wood of the sections when operated upon and put together is usually dry, and it is customary to apply glue or some other adhesive substance to all of the bearing or contacting surfaces of the joint, for the purpose of binding the parts, and for aiding in preventing the sections from being accidentally or otherwise disjoined. In the case of flush tanks, which are subjected to more or less moisture at all times, as described, the use of glue or cement alone will not prevent the ordinary dove-tail joint from gaping open when the wood expands.

The present invention is intended to overcome all of the imperfections and weaknesses of the older joints of the class, by providing the flange 12, which is arranged exactly parallel to the inner surface 17 of the part B, and the cutting or forming of the edge or end 6 of part A at right angles to the inner surface 7 of said part, whereby when the parts are joined together, the end of part A is received within and comes to a firm and full bearing against the flange 12. These features when taken with the under-cutting or beveling of the mortises and tenons of the respective parts, and also the provision of the spaces 13 for reducing the strain upon the joint, all serve to prevent the sections from springing apart in any direction by reason of the handling, or the expansion of the wood. Since the expansion of the wood due to its absorption of moisture only increases the breadth and thickness, and does not increase the length of the wood, any expansion of parts A and B will tend to draw or compress the opposing surfaces of the joints more tightly together without the possibility of the joint 16 gaping or opening.

Fig. 9 shows, in an exaggerated manner, the gaping of a joint when the dove-tail is not made in accordance with the principles and methods as herein shown and described, notably when the joint 16′ is made at an angle instead of parallel to the inner surface 17′ of part B.

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

1. In combination, two sections of wood

joined together by a dove-tail joint, the said joint being concealed and comprising a series of tenons and a series of mortises arranged alternately in one edge of each section, the mortises of one section adapted to receive the tenons of the second section, and the mortises of the second section adapted to receive the tenons of the first section, the mortises and tenons of each section being under-cut or beveled inwardly toward one face of the section so as to effect the positive interlocking of the sections, the mortises of one section being cut deeper or longer than the thickness of the tenons of the other section, for providing free spaces adapted to relieve the joint from strain when the wood is under expansion, and an insulating substance disposed in the said free spaces for excluding moisture from the joint.

2. In a blind dove-tail joint, the combination with two pieces of wood capable of being joined together to form a right angle, of a wrought joint comprising a series of mortises and a series of tenons formed within the corresponding inner edges of said pieces, the mortises and tenons of each piece alternating regularly, the mortises of one piece arranged to receive the tenons of the other piece and vice versa, the mortises and tenons of each piece under-cut at like angles toward one face of the section and adapted to closely interfit for interlocking the said pieces when joined together, the mortises of one section extending longitudinally a greater distance than the thickness of the tenons of the other section for providing a series of spaces into which the wood of either section may crowd or run when expanding under the influence of moisture.

3. The combination with two sections of wood capable of being joined together to form a right angle, of a wrought joint comprising a series of mortises and a series of tenons formed within the corresponding inner edges of said pieces, the mortises and tenons of each piece alternating regularly, the mortises of one piece arranged to receive the tenons of the other piece and vice versa, the mortises and tenons of each piece beveled at like angles and adapted to closely interfit for interlocking the said pieces when joined together, the mortises of one section extending longitudinally a greater distance than the thickness of the tenons of the other section, for providing spaces into which the wood of either section may crowd or run when expanding under the influence of moisture, and an insulating substance in said space for sealing the joint and for excluding moisture therefrom.

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

TILGHMAN J. FLOREY.

Witnesses:

JOHN R. LINDABERRY,

AMZA W. ALLEGER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."