(No Model.)

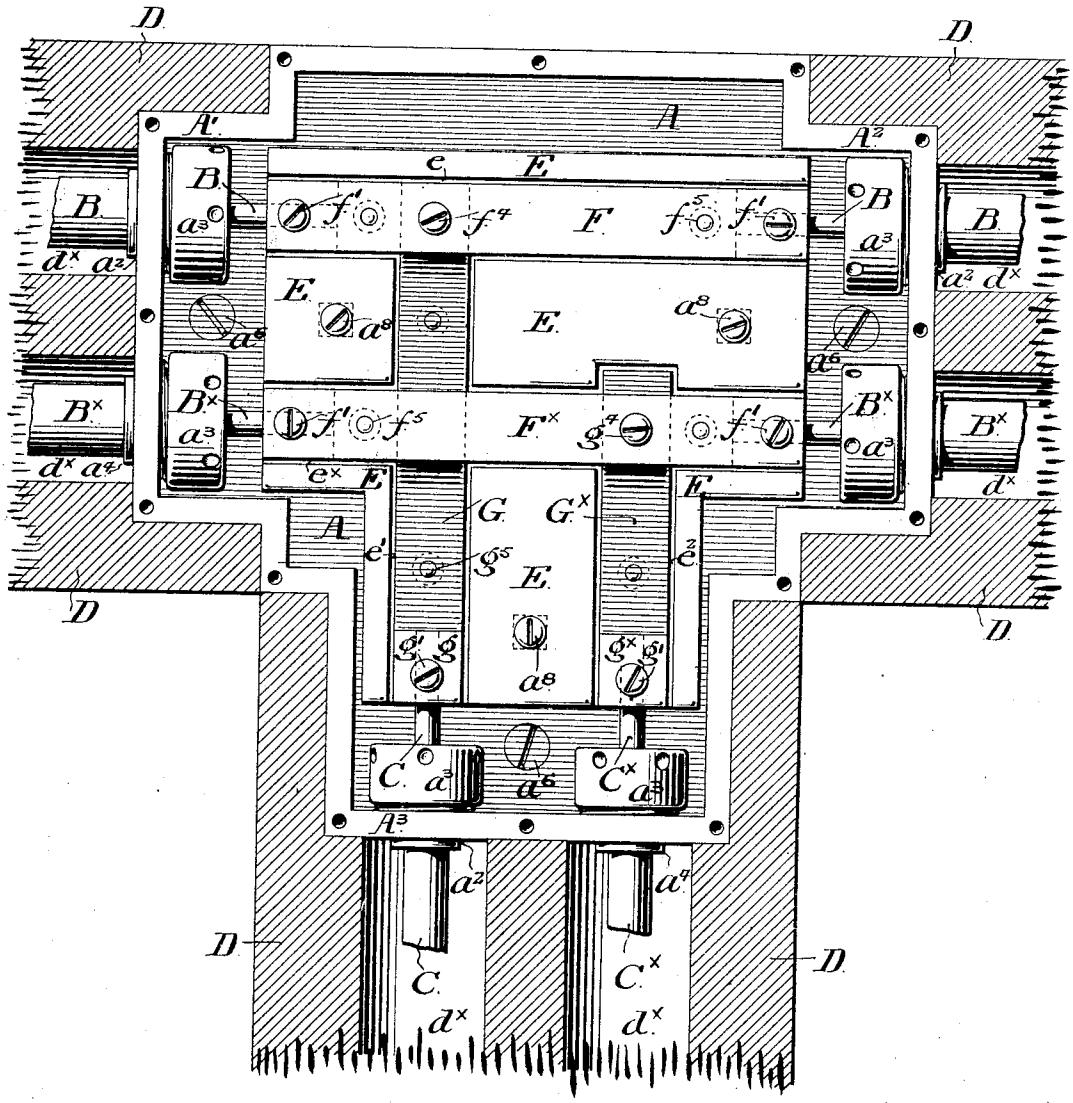
6 Sheets—Sheet 1.

E. J. McEVOY.

JUNCTION BOX.

No. 502,083. Patented July 25, 1893.

FIG. 1.



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Wm. C. Franklin Jr.

J. Bonsall Taylor

WITNESSES:

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(No Model.) 6 Sheets—Sheet 2.

E. J. McEVOY.

JUNCTION BOX.

No. 502,083. Patented July 25, 1893.

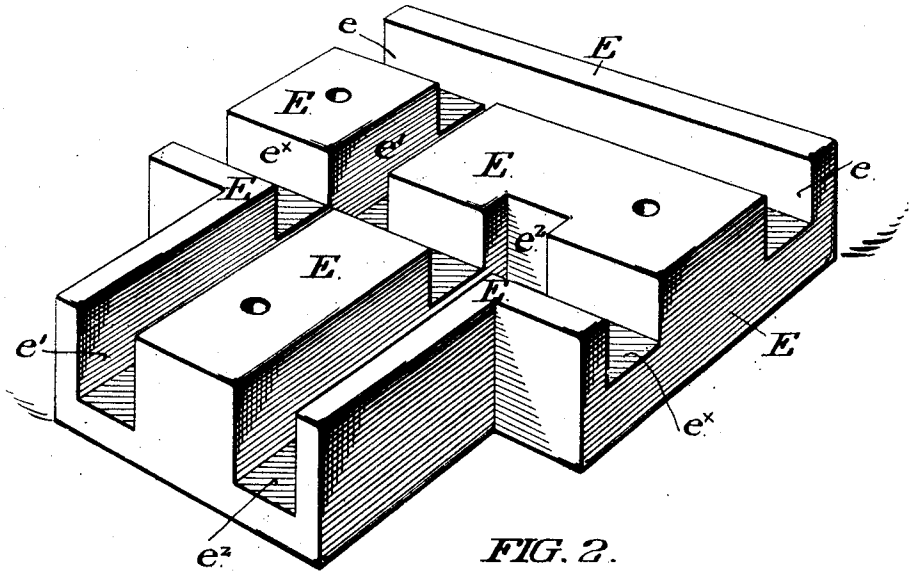

FIG. 2.

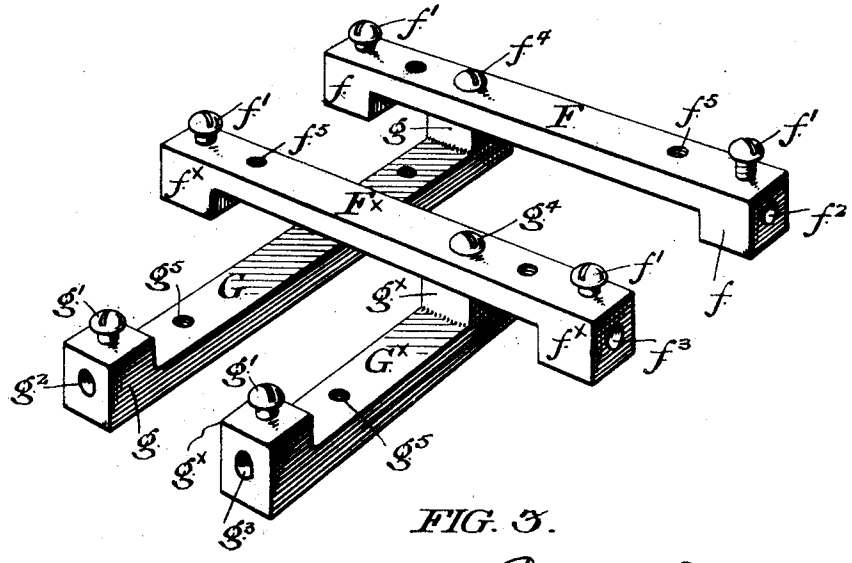

FIG. 3.

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(No Model.) 6 Sheets—Sheet 3.

E. J. McEVOY.

JUNCTION BOX.

No. 502,083. Patented July 25, 1893.

FIG. 4.

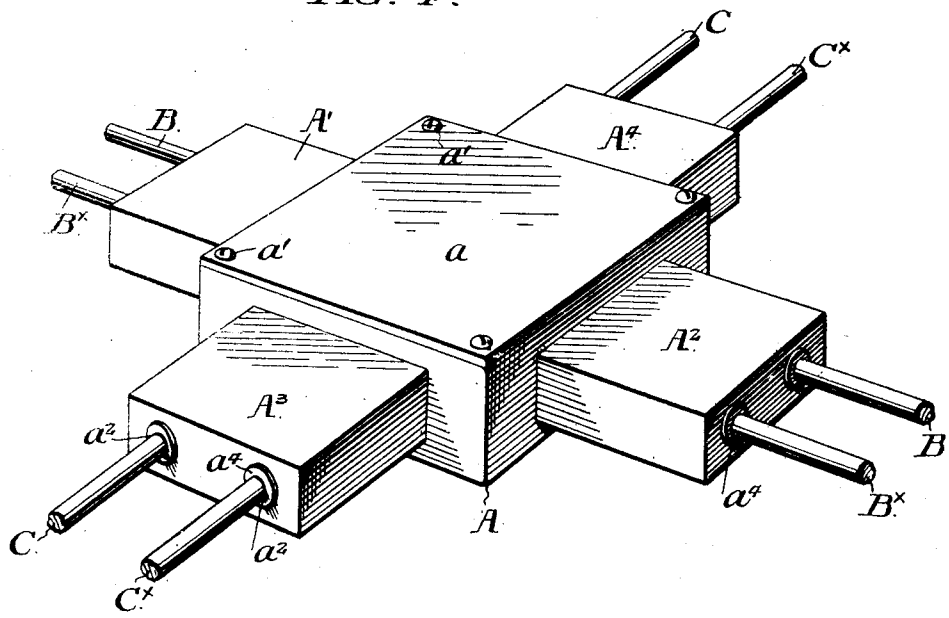


FIG. 5.

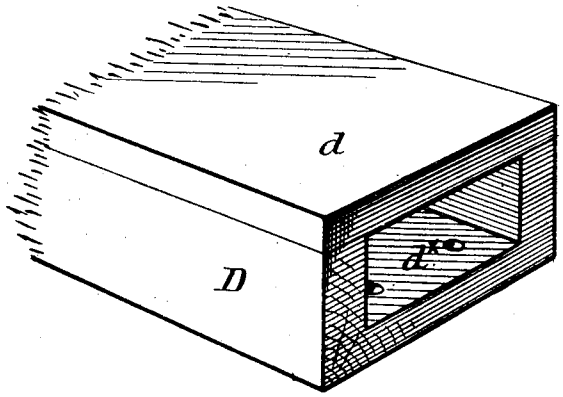
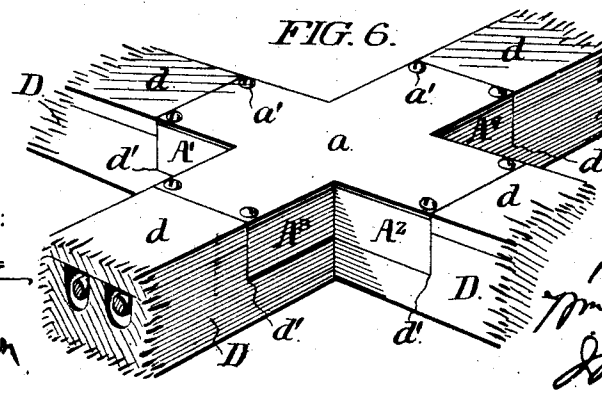


FIG. 6.



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(No Model.) 6 Sheets—Sheet 4.

E. J. McEVOY.

JUNCTION BOX.

No. 502,083. Patented July 25, 1893.

FIG. 7.

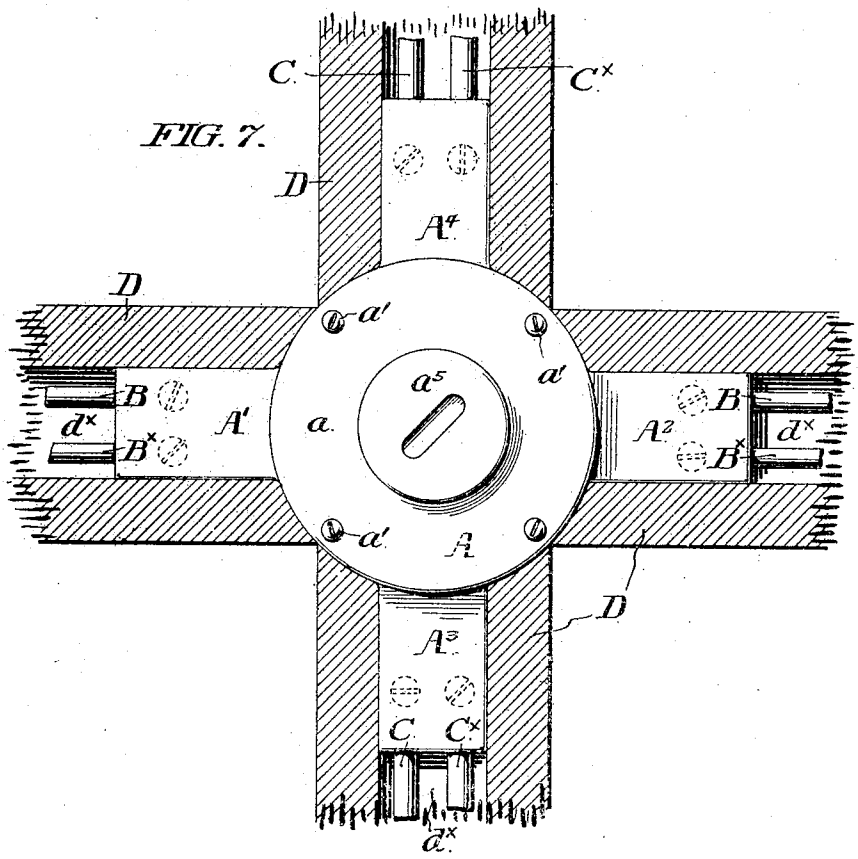
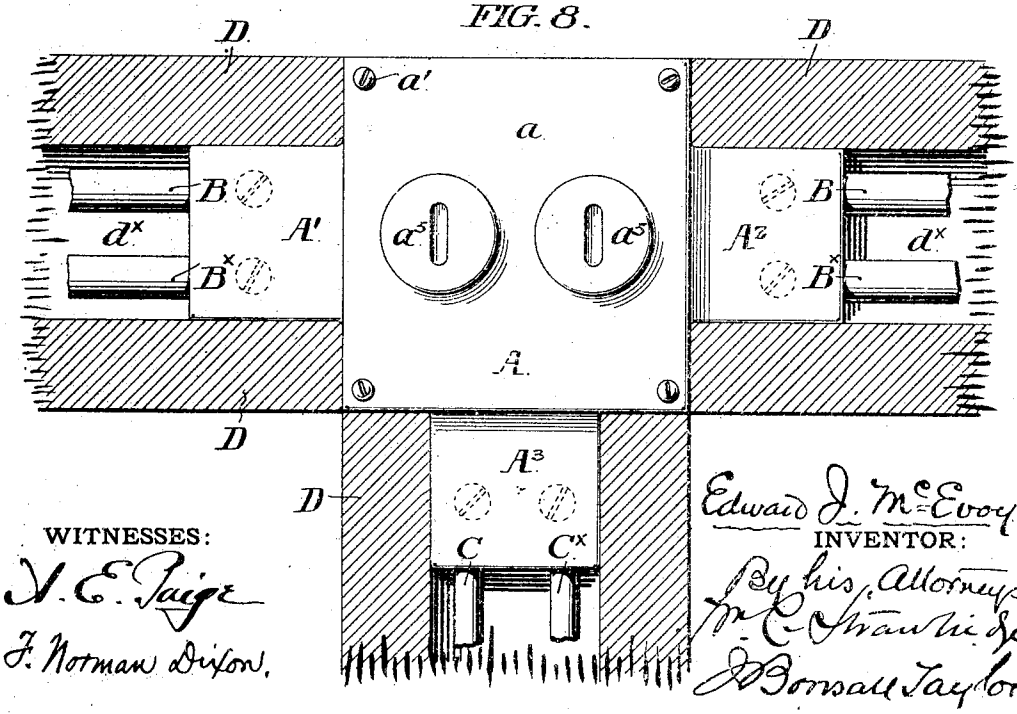


FIG. 8.



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JUNCTION BOX.

No. 502,083. Patented July 25, 1893.

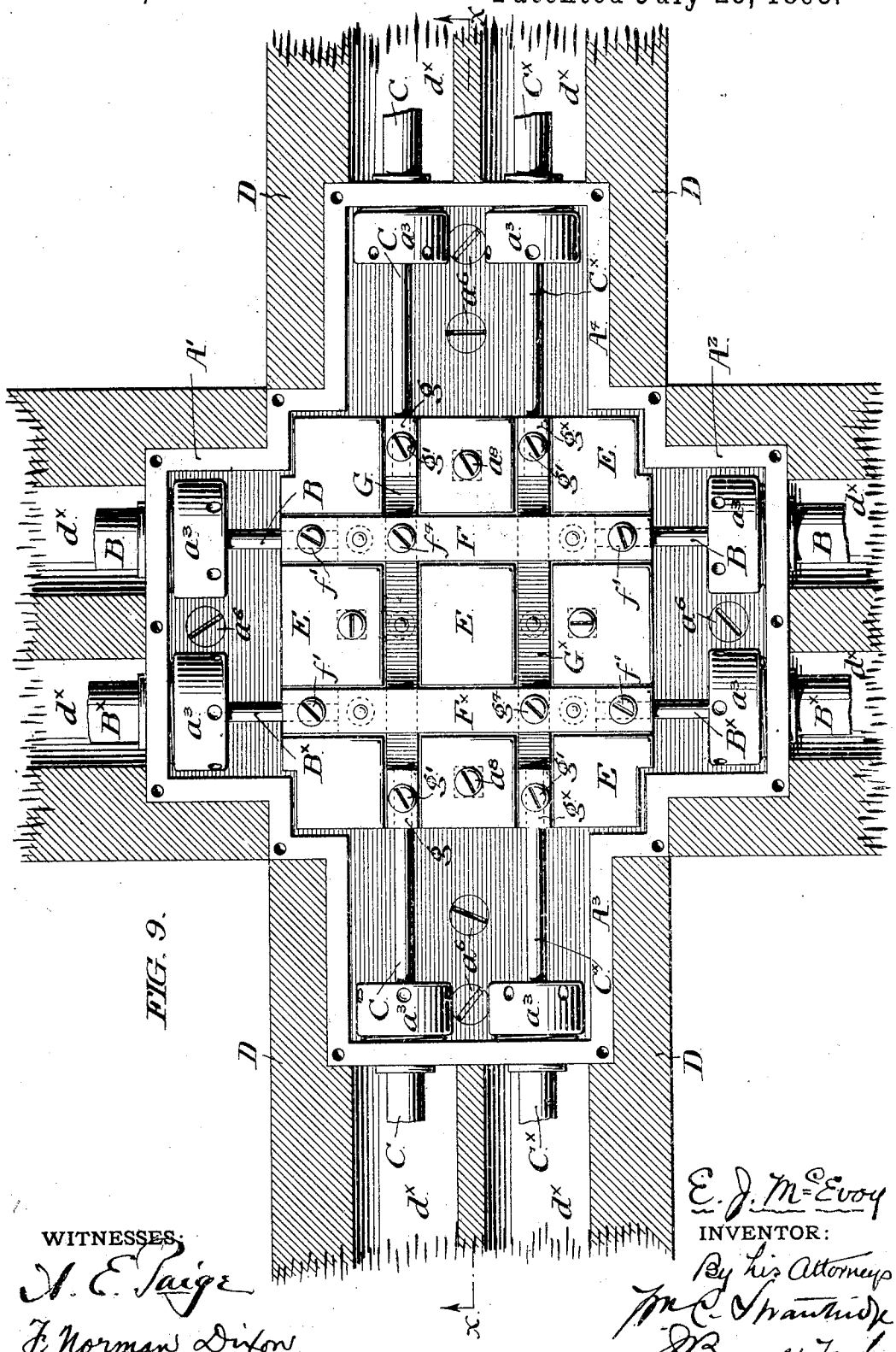

FIG. 9.

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6 Sheets—Sheet 6.

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JUNCTION BOX.

No. 502,083. Patented July 25, 1893.

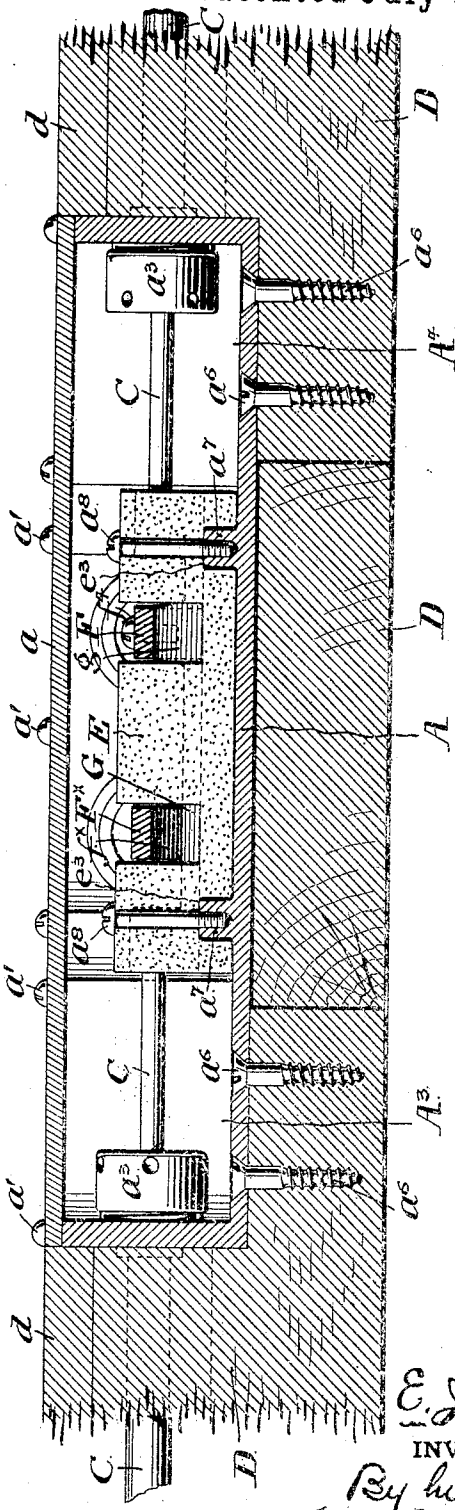

FIG. 10.

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UNITED STATES PATENT OFFICE.

EDWARD J. McEVOY, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO THE WILLIAM CRAMP & SONS SHIP AND ENGINE BUILDING COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

JUNCTION-BOX.

SPECIFICATION forming part of Letters Patent No. 502,083, dated July 25, 1893.

Application filed January 3, 1893. Serial No. 457,035. (No model.)

To all whom it may concern:

Be it known that I, EDWARD J. McEVOY, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Junction-Boxes, of which the following is a specification.

My invention relates to that class of moisture-proof boxes which are employed in connection with systems of electric conductors, or wiring, to receive the terminals of main and branch wires, and within which connection is made between said main and branch wires.

The invention comprehends improvements in both single-branch and double-branch junction boxes, and is of especial applicability in connection with the wiring of ships, although it is applicable to systems of wiring employed in and connected with buildings.

In the wiring of ships, to which, as stated, my invention has especial relation, the junction boxes heretofore employed to receive the terminals of the various main and branch wires, have been of cubical or quadrangular form, and employed in connection with moldings which have incased or inclosed and protected the wires and been caused to abut against the flat ends or sides of the boxes, the joints having been made as close and perfect as possible, but having been open or "butt" joints, the extremities of the moldings having been squared-off to present plane surfaces correspondent respectively with the plane surfaces of the sides and ends of the boxes. By reason of the constant vibration to which ships at sea are subject, it has been found that the joints between the moldings and the boxes, no matter how securely the boxes on the one hand and the moldings on the other may have been secured to the ship, have worked loose, and that the wires have become either broken at the joints or shaken loose and disconnected within the boxes.

It is the object of my invention to prevent this working of the joints, with its attendant disadvantages, and, in addition, to improve the construction of the base-blocks with which the junction boxes have been provided, and of the conductors or wire-connecting bars with which the base-blocks have been equipped, and which serve to electrically connect particular wires, in such manner that in the application, connection, disconnection, or removal, of the wires and connecting bars, all chance of short-circuiting will be avoided.

In the accompanying drawings I have represented, and hereinafter I describe, preferred embodiments of my invention, the subject-matter which I claim as novel being definitely specified in the claiming clauses.

In the accompanying drawings, Figure 1 is a top plan view of a single-branch junction box embodying my improvements, and shown in its application to its moldings; the cover of the box and the cover strips of the moldings being supposed to be removed in order the more clearly to exhibit the construction of the box and the mode of its application to the moldings. Fig. 2 is a view in perspective of the base-block represented within the junction box of Fig. 1, removed therefrom. Fig. 3 is a view in perspective of the connecting bridge bars represented in Fig. 1 as in place within the base-block, removed therefrom, but so relatively disposed with regard to pictorial representation that they may be readily imagined as in place within the aforesaid block as shown in perspective in Fig. 2,—the representation of the grooves or channels within which they would obscure were they actually drawn in place. Fig. 4 is a view in perspective of the double-branch junction box represented in Figs. 9 and 10, removed from its moldings. Fig. 5 is a view in perspective of the end portion of a molding of the character employed, for instance, in connection with the junction box represented in Fig. 4. Fig. 6 is a view in perspective of a double-branch junction box embodying my improvements in a slightly modified form, and shown as applied in connection with moldings suitably recessed to receive it. Fig. 7 is a top plan view of a double-branch junction box embodying my improvements in a slightly modified form, and shown as applied in connection with moldings from which the cover strips are supposed to be removed. Fig. 8 is a view similar to Fig. 7, of a single-branch junction box, of the character, for instance, of that shown in

Fig. 1, the recessing of the moldings being, however, slightly different, and their cover strips being omitted. Fig. 9 is a top plan view of a double-branch junction box, such, for instance, as that represented in Fig. 4, the cover being removed, and the moldings uncovered or sectioned to exhibit the mode of their application. Fig. 10 is a central, vertical, longitudinal, sectional elevation through the box and moldings of Fig. 9, in the plane of the dotted line *x*—*x* on said figure, and sight being taken in the direction of the arrows upon said line.

Similar letters of reference indicate corresponding parts.

It is proper to explain that I have, for clearer illustration, omitted from the junction boxes represented the fuse devices which are usual in boxes of this class, and which may, of course, be applied in any preferred manner in connection with boxes embodying my improvements.

Referring, first, to those features of my invention which are concerned with the prevention of the working of the joints between the box and its moldings, it is proper to explain that I accomplish the desirable result by so correspondently forming and recessing the box and its moldings, and relatively applying them, that they are respectively adapted and caused to overlap, or "take" the one within the other, somewhat after the manner, for instance, of the respective members of a tenon joint, a rabbet joint, an angle joint, or other kindred lap joint.

Referring, first, to the double-branch junction boxes represented in Fig. 4:—The body of the box is designated by the letter A, and is shown as of quadrangular form and as provided with lateral wings or extensions, designated A′ A^2 A^3 A^4, respectively of quadrangular form, and respectively projecting from the respective sides of the body integral with which they actually or in effect are. Portions of the main wires B $B^\times$, and of the branch wires C $C^\times$, are shown as respectively protruding from the wings A′ A^2 and A^3 A^4.

In Fig. 5 is represented the end portion of a molding D, having a cover strip *d*, and a longitudinal wire-receiving channel or recess $d^\times$, of such dimensions as to conform it to snugly receive within it, for instance, the wing A′ of the box of Fig. 4, and also to receive and inclose the main wires B $B^\times$ which protrude from said wing.

Obviously when the wing A′ is introduced within the recess of the molding, and the end face of said molding caused to abut against that side of the body of the box from which said wing springs, a solid and tight joint will be formed between the box and the said molding, which will prevent any possible working of either with respect to the other, and assure the maintenance of the inclosed wires without injury or liability of disconnection.

Regarding the construction of the box represented in Fig. 4, and just described,—in which the wings or extensions of the body are of less vertical and transverse dimensions than those of the respective sides from which said wings respectively spring,—in the light of an extreme illustration of the construction of the box with lateral extensions conforming to and adapted to be entered within recesses in the moldings,—it will be apparent that the idea will be equally embodied in, for instance, the form of box represented in Fig. 6, in which the extensions both as to depth and width correspond with the depth and width of the body, the box as an entirety being in the form of a Greek cross; and that the same result of the prevention of working will be accomplished when a box of such form is applied in connection with moldings recessed as at *d*′ in the manner represented in said Fig. 6, with respect to the interior wire-inclosing recesses of which the entire extensions are not entered and inclosed.

Obviously the invention, so far as it relates to the prevention of the working of the joints, is embodied in either the form and mode of application represented in Figs. 4 and 5, or in the form and mode of application represented in Fig. 6, or, in fact, in many other well known forms of lap or kindred joints of which the box and molding are the respective members.

In any case the moldings are, of course, firmly affixed to the wall or ceiling to which they are applied, and the box firmly affixed either to the wall or ceiling or to portions of the moldings. The fixation is most conveniently performed by screws.

In the junction box represented in Fig. 7, a modified form of my invention is represented, in which the body of the box is cylindriform and not quadrangular, the extensions, however, being quadrangular, although they may be of other forms.

The single-branch junction box represented in Figs. 1 and 8 embodies the same features of extensions for application relatively to the moldings, that the double-branch boxes of Figs. 4, 6, 7, 9, and 10, embody, the only difference being the omission of one of the branch extensions.

The material of which all of the junction boxes represented and described is composed, is preferably metal, and their mechanical construction such as convenience of manufacture may dictate, although they are usually made as castings. All of them are provided with covers *a* conveniently secured by screws *a*′, or otherwise if desired; and all of them are provided with the usual lateral threaded apertures a^2 for the entrance of the wires, to which are applied the usual tightening-up threaded thimbles a^3 which compress the annular packings a^4 with respect to the apertures and wires, and render the box as an entirety moisture-proof.

The covers of the boxes are, if desired, provided with holes through which access may be had to the interior of the boxes, and these

holes are provided with screw caps a^5 of any preferred character.

The boxes may be conveniently secured with relation to their moldings by screws a^6 which pass through their bottoms, as shown in Figs. 1, 9, and 10.

Referring now to those features of my invention which are concerned with the base-block and the connecting bridge bars, the general idea is to construct the base-block with intersecting channels or grooves for the respective main and branch connecting bridge bars, of different depths, in order that the bodies of these bars, while lying completely within the channels, may yet respectively lie above and below each other;—and, to the same result, to form the connecting bridge bars themselves with end lugs of depth or height greater than the thickness of the body portion of the bars, in order that not only may the respective main and branch bridge bars when reversely disposed as shown in Fig. 3, cross each other with adequate clearance between them, but also that the openings in the ends of said bars with respect to which the binding screws operate for the securing of the ends of the wires, may all occupy a practically common level in a plane parallel with the plane of the bottom or top of the box, to the further end that all of the apertures in the walls of the box through which the main and branch wires pass may be formed upon a common level, preferably in the same plane, so that moldings uniformly recessed may be employed, and, that, in addition, all of said wires to the extent to which they exist within the box may occupy a common plane, and not be bent either upward or downward.

Embodiments of the foregoing construction and relative arrangement of the base-block and its connecting bridge bars are especially illustrated in Figs. 1, 2, 3, 9, and 10, and may be described in the following manner:—

E is a base-block composite of porcelain or other vitreous or non-conducting substance, to the body proper of which the said letter E is particularly applied. This block is preferably conformed to the interior of the junction box within which it is to be mounted, and in single-branch boxes conveniently possesses the form represented in Figs. 1 and 2, while in double-branch boxes it is well made when of the shape represented in Figs. 9 and 10.

The block is secured in any preferred manner within the junction box, conveniently by being provided with sockets e^3, Fig. 10, formed in its under surface and which are adapted to register with respect to lugs or fillets a^7, springing from the bottom of the junction box,—screws a^8, passing through the block, being threaded into the lugs, as shown in Fig. 10.

The channeling of the block varies with its character and form, that is to say, in double-branch blocks the branch channels as well as the main channels extend completely across the block, as shown in Figs. 9 and 10, whereas in single-branch blocks the branch channels preferably stop short of one side of the block, as shown in Figs. 1 and 2. Of course where there are more or less than two main and two branch wires, the channels preferably correspond in number and in trend with the number of bridge bars required.

Referring now to the single-branch block shown in Figs. 1 and 2,—e $e^\times$ are the main channels, or those within which the main connecting bridge bars F $F^\times$ are entered, and e' e^2 are the branch channels or those within which the branch connecting bridge bars G $G^\times$ are entered.

As will be observed from a reference to Fig. 2, the main channels e $e^\times$ traverse the entire length of the block and are conveniently made of a uniform depth, approximately, for instance, half that of the block; whereas the branch channel e' traverses the block to almost its full breadth, and to an extent sufficient to cause it to intersect both main channels, while the branch channel e^2 traverses the block to considerably less than its full breadth, and to an extent sufficient to cause it to intersect the main channel $e^\times$ alone. It will also be observed that both branch channels are of the same depth, approximately, for instance, three-quarters that of the block. It is apparent that a block of the foregoing character, (and also of the character represented in Figs. 9 and 10,) embodies angularly-disposed or intersecting channels, or sets of channels, which by individual channels, or by sets of channels, are relatively of different depths.

Good forms of main bridge bars F $F^\times$ and of branch bridge bars G $G^\times$ are shown in Fig. 1 as in place within the block of Fig. 2, and in Fig. 3 as removed therefrom. It will be observed that each of these bridge bars is formed as a bar of metal, the ends of which are provided with lugs or heels f $f^\times$ g $g^\times$ preferably integral with the body portions of the bars and all of corresponding breadth or depth.

The lugs f $f^\times$ of both ends of the main bridge bars in the arrangement represented are provided with longitudinal holes or openings f^2 f^3 with respect to which are applied binding screws f'. Into these openings are entered the end portions of the main wires B $B^\times$ led into the box as already explained through the apertures a^2. Both lugs f and both lugs $f^\times$ are of the same depth, and both the bars F $F^\times$ are similarly disposed in their channels.

The branch bridge bar G is provided with lugs g, and the branch bridge bar $G^\times$ with lugs $g^\times$, with reference to which the hole g^2 in the bar G and the hole g^3 in the bar $G^\times$ are respectively disposed, the binding screws g' serving to secure the ends of the branch wires C $C^\times$ when the latter are entered within the holes g^2 g^3.

As will be observed by referring to Fig. 2,

the branch conductors are disposed with their lugs extending upward, or in the opposite direction to that in which the lugs of the main bars extend.

Connection between the branch bar G and the main bar F is effected by a screw f^4 which passes through the main bar and is threaded into the lug of the branch bar; while similar connection between the branch bar $G^\times$ and the main bar $F^\times$ is effected by a screw g^4 which passes through the main bar and is threaded into the lug of the branch bar.

It will be observed that the level of the under faces of the lugs of the main bars in the arrangement represented in Fig. 3, is correspondent with the level of the upper faces of the bodies of the branch bars G $G^\times$, the under surfaces of the bodies of said branch bars occupying a lower level or one correspondent with the level of the floors of the branch channels in the blocks, whereas the level of the under faces of the lugs of the main bars corresponds with the higher level of the floors of the main channels.

f^5 g^5 are holes formed through the main and branch bridge bars for screws, by the aid of which these bars may, if desired, be permanently screwed to the block.

By reason of the relatively opposite or reversed disposition of the main and branch bridge bars when said bars are disposed within their channels in the block, a clearance of at least the represented depth of the body of a bar is secured between the main bar $F^\times$ and the branch bar G; and by reason, further, of the fact that when the bars are all in place in their channels in the block, the body of the latter intervenes in every direction between the respective bars,—no sliding of the screw driver or other tool employed in the connection or disconnection of the wires with respect to the bars can bring about such electrical contact as to occasion short circuiting.

The arrangement of the bridge bars represented in the construction of Figs. 9 and 10, is essentially identical with that represented in Fig. 3, with the exception that the branch channels in the block extend completely across it, and that the bodies of the branch bars are extended to the full length of said channels, and at their far extremities are equipped with additional lugs and binding screws.

In the essential particulars of the relatively opposite or reversed disposition of the bars considered with reference to the direction of projection of their lugs, and of the relative depth of the intersecting channels, the constructions are mechanically identical.

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

1. In a system of electric wiring, comprising wire-containing moldings and a junction box,—a joint between the junction box and a molding, formed by a relative counterpart overlap of the box and molding, substantially as set forth.

2. In a system of electric wiring comprising wire-containing moldings and a junction box,—a joint between a junction box and a molding, formed by the combination of a box formed with a lateral extension with a molding provided with an end recess conformed to said extension, substantially as set forth.

3. A junction box formed with lateral extensions of its body portion, substantially as and for the purposes set forth.

4. A junction box formed with lateral extensions of its body portion, in combination with moldings formed with end recesses adapted to said extensions, substantially as and for the purposes set forth.

5. In combination with a junction box having lateral apertures for the entrance of electric conductors, a base-block provided with intersecting channels of relatively different depths, substantially as and for the purposes set forth.

6. In combination with a junction box having lateral apertures for the entrance of electric conductors,—electric conductors,—a base-block provided with intersecting channels of relatively different depths,—and connecting bridge bars formed with heels, reversely disposed within said channels substantially in the manner described, and connected with the electric conductors,—substantially as and for the purposes set forth.

7. In combination with a base block for a junction box formed with intersecting channels of relatively different depths, intersecting connecting bridge bars formed with heels and respectively reversely disposed within said channels, substantially as and for the purposes set forth.

In testimony whereof I hereunto sign my name this 21st day of December, A. D. 1892.

EDWARD J. McEVOY.

Witnesses:
J. BONSALL TAYLOR,
WM. C. STRAWBRIDGE.