

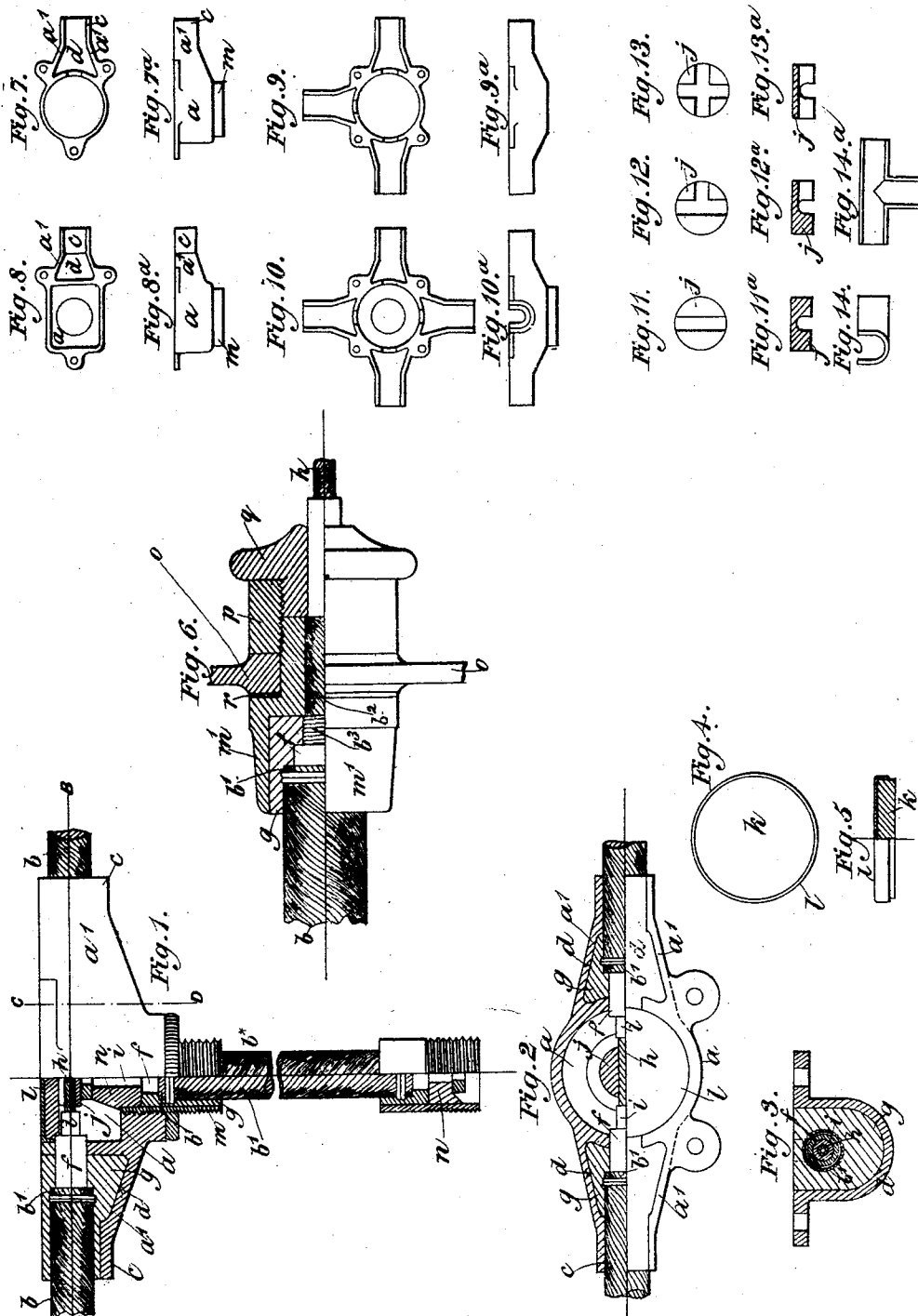
(No Model.)

W. B. SAYERS.

JUNCTION BOX.

No. 501,445.

Patented July 11, 1893.



Witnesses
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UNITED STATES PATENT OFFICE.

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JUNCTION-BOX.

SPECIFICATION forming part of Letters Patent No. 501,445, dated July 11, 1893.

Application filed June 16, 1892. Serial No. 436,987. (No model.) Patented in England October 6, 1891, No. 16,958.

To all whom it may concern:

Be it known that I, WILLIAM BROOKS SAYERS, a subject of the Queen of Great Britain and Ireland, residing at Glasgow, in the county of Lanark, Scotland, have invented Improvements in or Relating to Metallic Junction-Boxes and in the Method of Connecting Conductors Thereto, (for which I have obtained a patent in England, No. 16,958, dated October 6, 1891,) of which the following is a specification.

This invention has reference to the construction of metallic junction boxes or cases for concentric and other conductors or fittings for electric lighting, electrical bell circuits, and like apparatus, and to the method of connecting conductors thereto and it has for its object to provide improved means of connecting the lead or other external metallic sheathing of the conductors to the junction boxes or cases in such a manner that all liability of moisture entering such boxes is entirely obviated, while at the same time the improved construction greatly facilitates the making of the connection and the insertion of apparatus within the junction boxes.

In the accompanying drawings, Figure 1 shows partly in longitudinal section and partly in side elevation a metallic junction box with conductors connected thereto according to this invention. Fig. 2 is a plan thereof partly in horizontal section on the line A B Fig. 1. Fig. 3 is a transverse section on the line C, D, Fig. 1. Fig. 4 is a plan; and Fig. 5 is a part sectional elevation, of a metallic cover with insulating disk hereinafter referred to. Fig. 6 shows partly in section and partly in elevation a thimble end and a cable in conjunction with a cup joint for connection with a box. Figs. 7 to 10^a inclusive illustrate modified forms of junction boxes hereinafter referred to. Figs. 11 to 14^a inclusive illustrate various forms of contacts hereinafter referred to.

Referring to Figs. 1 to 5 inclusive, the junction box comprises a metallic receptacle *a* having two lateral extensions, each terminating in a neck or support *c* which is U shaped in cross section. Into these necks the cables or conductors *b* are laid as shown and between the end of each neck and the receptacle *a* the extension is formed with a pocket *d* of greater

width and depth than the diameter of the cable or conductor *b*, this pocket being tinned to insure union with the molten metal or alloy that is poured therein as hereinafter described to form a fluid tight metallic joint. Preparatory to laying the cable in each neck, a part of the outer stranded wire covering *b'* of the cable is removed so as to expose at the inner end of the neck a short length *f* of the lead covering which in conjunction with the wire covering *b'* constitutes, in the example shown, the outer conductor. The portion of the stranded wire covering *b'* of the cable which extends into the pocket is tinned, and the short length *f* of the exposed lead coating is cleaned and treated with flux or it may also be tinned, to insure union of both lead and outer covering with the fusible metal *g* with which the pocket and neck are filled as hereinafter described. The central conductor *h* of the cable and its insulating covering *i* and preferably also the end of the exposed part *f* of the lead covering, pass intact into the receptacle *a* wherein is arranged a contact piece *j* or other apparatus.

To form a fluid tight joint between each metallic extension *a'* and the wire covering *b'* and the exposed part *f* of the lead covering I proceed as follows:—The receptacle *a* is first filled with suitable material such as sand, and then molten metal having a lower melting point than that of lead is poured into the pocket *d* and neck *c* and allowed to overflow until the extension *a'* and the external conductor and wire covering are sufficiently heated to insure metallic union between them and the molten metal or alloy *g*. Or the pocket may be filled until the metal is flush with the upper surface of the extension, and the whole afterward heated until union is effected as described to form a fluid tight metallic joint. A fusible alloy suitable for the purpose mentioned consists of equal parts by weight of tin and lead. After the alloy is solidified, the sand is removed from the receptacle *a*. The apparatus to be fitted in the receptacle and connected to the central conductor *h* is then put in place, and backed up and supported by a disk or diaphragm *k* (Figs. 4 and 5) of insulating material, the top of the receptacle being finally sealed with a metallic plate *l*

that is soldered or otherwise secured to the upper end of the metallic receptacle so as to form a fluid tight joint therewith.

Cast in one with or secured to the receptacle *a*, as for instance by screwing, is a cup or socket *m* (hereinafter called a socket), the axis of which is shown in line with that of the receptacle *a*. This socket *m* is open at its outer end for the reception of a cable, but with the exception of a hole of sufficient diameter for the passage of the insulated central conductor *h* is closed at the inner end by a filling plug or neck *n* of insulating material. Previous to inserting a cable *b* through the open end of the socket, which is of greater diameter than the cable to be passed there-through, a part of the stranded wire covering *b'* of such cable is removed so that while it extends for a distance into the cup or socket, it does not reach the closed end or part *n* but exposes a length of the lead covering *f*. The end of the stranded wire covering *b'* and the inside of the socket *m* are tinned and the exposed portion of the lead covering *f* is cleaned and treated with flux or it may be also tinned to insure metallic union with the filling *g* of molten metal or alloy which is poured into the annular space between the cable and the socket to form a fluid tight metallic joint between the two in the manner hereinbefore described for forming a similar joint between the similarly prepared cable and the metallic extension *a'*. The other end of the pendent cable *b*, which is shown as a pendent cable, may also be provided with a like cup joint as shown, for coupling it to a lamp holder or other fitting.

Fig. 6 shows a socket or thimble which may be connected to the end of a cable in the manner hereinbefore described. *m'* is a socket or thimble corresponding to the socket *m* (Fig. 1). *o* is the wall of a metallic box for holding apparatus with which the inner conductor *h* is required to be connected. The socket or thimble *m'* passes through a hole in the wall *o* of box and is secured by a nut *p* which is extended as shown so as to allow of a nozzle *q* of insulating material being screwed into it. *r* is a washer of suitable material, for example lead, arranged between the socket *m'* and the wall *o* of the metallic box to form a fluid tight joint. *b²* represents copper stranding that may be arranged beneath the lead covering of the cable so as to form part of the outer conductor, when the combined conductivity of the external sheathing and the lead covering does not equal the conductivity of the central conductor *h*. The lead covering *f* extends only for a short distance into the annular space into which the molten metal *g* is poured, the copper stranding being exposed for the remaining distance to insure union between it and the thimble *m'*, lead covering *f* and external sheathing *b'*. The copper stranding *b²* may be bound with tinned copper wire as indicated at *b³*.

Figs. 7 and 7^a show in plan and elevation

respectively, a butt junction box that is to say a junction box having only one lateral extension *a'* adapted to be connected to a cable in the manner hereinbefore described. Figs. 8 and 8^a are similar views of a somewhat similar junction box but in which the receptacle *a* is of rectangular form in plan instead of circular as in Figs. 7 and 7^a. Figs. 9 and 9^a are similar views to Figs. 7 and 7^a showing a blind three way junction box, and Figs. 10 and 10^a are similar views of a four way junction box.

Figs. 11 and 11^a illustrate in inverted plan and cross section respectively a contact disk suitable for use in three way junction boxes such as shown in Figs. 1, 2 and 3 or butt junction boxes such as shown in Figs. 7 and 8 for connecting the central conductors of two pairs of concentric conductors.

Figs. 12 and 12^a are similar views to Figs. 11 and 11^a respectively illustrating a contact disk suitable for a three way junction box such as shown in Figs. 9, 9^a.

Figs. 13 and 13^a are similar views to Figs. 11 and 11^a showing a contact disk suitable for use in a four way junction box such as shown in Figs. 10 and 10^a.

Figs. 14 and 14^a are respectively a side view and inverted plan of a three way junction piece suitable for connecting central conductors and cables of large size.

What I claim is—

1. A junction box comprising a metallic receptacle *a* to contain electrical connections and having integral therewith one or more metallic extensions each consisting of a U-shaped pocket *d* of greater depth and width than the diameter of the cable to be passed therethrough and terminating in a U shaped neck *c* into and through which said conductor can be passed said pocket and neck being open at the top and serving to hold a fusible jointing metal substantially as herein described for the purpose specified.

2. A junction box comprising a metallic receptacle *a*, having integral therewith one or more lateral metallic extensions each formed with a pocket *d* terminating in a neck *c* said pocket and neck being of U-shape in cross section and open at the top, and a socket arranged at right angles to said extensions and coaxial with said receptacle, substantially as described for the purposes specified.

3. In a junction box, the combination of a metallic receptacle having integral therewith one or more metallic extensions each open at the top and of U-shape in cross section, concentric conductors extending through each of said extensions and the inner of which extends into said receptacle, fusible metal cast within and so as to fill said extensions and form a fluid-tight metallic and electrical joint between the outer of said concentric conductors and said extensions and a metallic cover *l* hermetically sealing the top of said receptacle substantially as herein described for the purpose specified.

4. In a junction box, the combination of a metallic receptacle having integral therewith a lateral extension consisting of a pocket open along the top and of U-shape in cross section, and also a socket, concentric conductors arranged within said lateral extension and the inner of which extends into said receptacle, fusible metal located within and filling said pocket and forming a fluid tight metallic joint between the outer of said conductors and said lateral extension concentric conductors arranged within said socket and the inner of which also extends into said receptacle, fusible metal forming a fluid tight metallic joint between the outer of said last mentioned conductors and said socket, conducting material uniting the portions of the two inner conductors that extend into said receptacle, and a fluid tight cover soldered to the top of said receptacle flush with the top of the filling in said extension, substantially as herein described.

5. In a junction box, the combination of a metallic receptacle *a* having integral therewith lateral extensions each consisting of a pocket *d* and neck *c* of U-shape in cross section and open at the top, and a socket *m* extending from its bottom, with concentric con-

ductors extending through said extensions and the inner of which also extends through said receptacle, fusible metal forming a fluid tight metallic joint between the outer of said conductors and each of said extensions and filling said extensions so as to be flush with the top thereof, concentric conductors extending into said socket, and the inner of which also extends into said receptacle, fusible metal forming a fluid tight metallic joint between the outer of said last mentioned conductors and said socket, a contact piece uniting the two inner conductors within said receptacle, and a fluid tight cover sealed in the top of said receptacle and insulated from said inner conductors substantially as herein described for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM BROOKS SAYERS.

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