Sept. 28, 1954 H. HUBBELL 2,690,545

LEAD WIRE CONNECTOR

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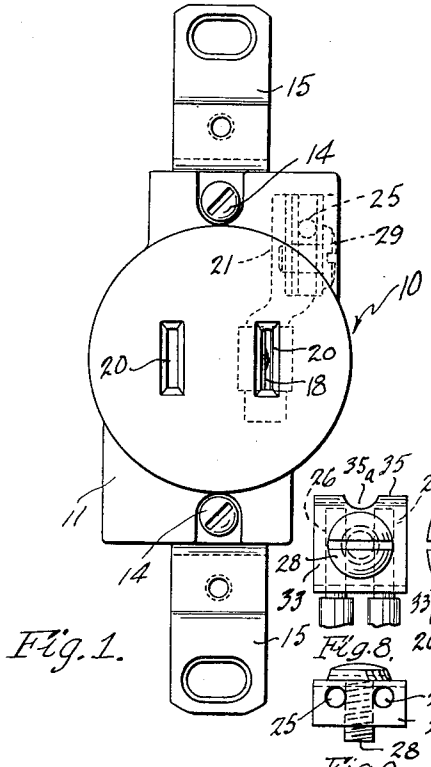


Fig. 1.

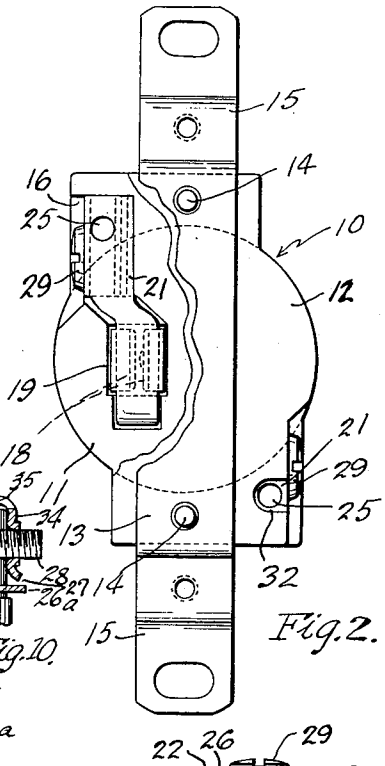


Fig. 2.

Fig. 9.

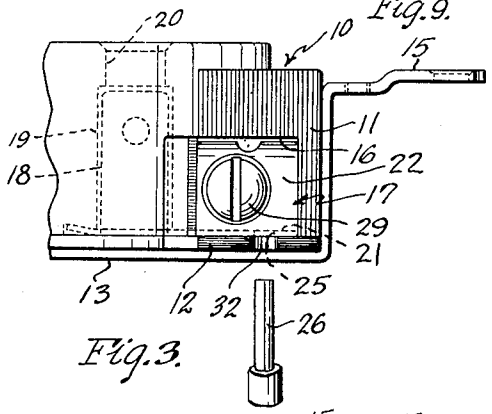


Fig. 3.

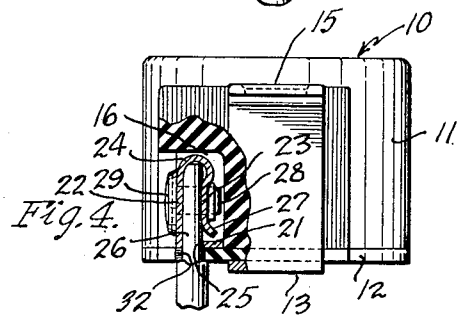


Fig. 4.

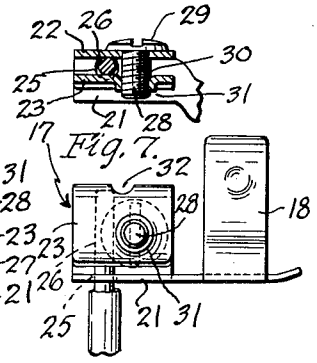


Fig. 7.

Fig. 6. Fig. 5.

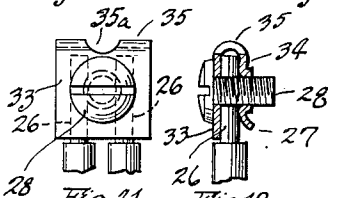


Fig. 11. Fig. 12.

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LEAD WIRE CONNECTOR

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12 Claims. (Cl. 339—246)

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This invention relates to a lead wire connector adapted for either connecting two or more lead wires together or for connecting lead wires to electrical fittings.

An object of the invention is to provide a simple and effective means for connecting two or more lead wires by merely inserting the bared or stripped ends of the wires into position in the connector and then securing or clamping them by merely tightening up a binding screw.

It is also an object of the invention to provide a simple and effective lead wire connector for so-called bottom wiring of electrical devices, and by which a lead wire from the house wiring system may be connected to a contact in the fitting by merely inserting the bared or stripped end of the wire into position and then securing or clamping it by merely tightening up a binding screw, without the necessity of wrapping the wire about the screw, although if desired a wire could be connected to this connector by wrapping it about the screw in the usual manner.

Another object is to provide means for connecting the wire in the manner stated which is of simple and economical construction.

With the foregoing and other objects in view, I have devised the construction illustrated in the accompanying drawing forming a part of this specification. It is, however, to be understood the invention is not limited to the specific details of construction and arrangement shown, but may embody various changes and modifications within the scope of the invention.

In this drawing:

Fig. 1 is a front view of a wall outlet receptacle of conventional type with my improved connector applied thereto;

Fig. 2 is a back view with the parts broken away to more clearly show the construction;

Fig. 3 is a side view of a portion of this device showing my improved connector in position;

Fig. 4 is a partial end view and partial section showing the lead wire in position;

Fig. 5 is a side view of the connector removed from the fitting;

Fig. 6 is a section substantially in the plane of the lead wire looking from the left of Fig. 5;

Fig. 7 is a partial horizontal section substantially in the plane of the binding screw;

Figs. 8, 9 and 10 are front, bottom and sectional views respectively showing the connector used for securing together the ends of a pair of conductor wires, and

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Figs. 11 and 12 are front and sectional views respectively of a similar connector showing a modification.

While the invention is shown in the accompanying drawing and described herein as embodied in a connector for the free ends of a plurality of conductor wires, and also as embodied in a wall outlet receptacle, it is to be understood the invention is not limited to such an application as it may be used in other types of electrical fittings, or may be used separately as a wire connector unsupported by insulation.

In the drawing a receptacle is shown as comprising a body 10 of insulating material including a body block 11 of molded material and a rear cover plate 12 of pressed insulating material secured to the back surface of the body block by any suitable means, such, for example, as clamping it under the usual metal yoke or strap 13 at the rear of the body, secured by the usual screws 14 extending through the body and threaded into the strap or yoke, the yoke including the usual ears 15 for mounting it in the wall outlet box (not shown). The body is provided with recesses 16 in opposite side walls thereof for mounting the lead wire connectors 17 connected to one or more receptacle contacts 18 mounted in recesses 19 within the body opening through the back of the block 11 and located back of the elongated slots 20 leading from the front wall to these contacts for entrance of the contact blades of the standard attachment plug caps. The cover plate 12 covers the backs of the recesses or chambers 19 as well as the backs of the side recesses 16.

The connector in the present case comprises a base or bar 21 to which the receptacle contact members 18 are connected, this being in this construction shown as a flat metal plate or strip, and the spring contacts 18 may be either integral with it or secured to it by a separate means. The lead wire connector comprises a spring clamp of substantially U shape, including the legs 22 and 23 arranged side by side and connected at their outer ends by the curved transverse connecting wall 24. The leg 22 is secured at its outer end to the base or bar 21.

In the present construction it is shown as integral with the bar 21 and bent laterally from one side edge thereof to a position at substantially right angles to this base. The other end of the leg 23 is free so that this leg is movable toward and from the leg 22, and by its resilient action tends to move away from the leg 22. The base or bar 21 is provided with a lead wire guide opening 25 through it at the inner side of the leg 22 and in substantial alignment with the space between the legs 22 and 23 and facing the connecting wall 24. This acts as a positioning and guide means for the bared or stripped end 26 of the lead wire, and the free end of the leg 23 is preferably curved laterally or outwardly somewhat as shown at 27 to guide the end of the lead wire to position between the legs. The connecting end wall 24 acts as a limit stop for the free end of the wire to limit the amount the wire is inserted into the connector. Extending transversely between the legs 22 and 23 and at one side of the lead wire 26 when in the securing position is the shank 28 of a binding post screw, the head 29 of which is located on the outer side of the leg 22. This screw is adapted to clamp the lead wire 26 between the legs 22 and 23, and although the screw could be provided with a separate nut, it is preferably threaded in the opposite leg from the leg the head engages, in this case the movable leg 23, as indicated at 30, and to secure more threads for holding the screw a portion of the leg 23 around the opening may be drawn laterally to form a flange 31. In order to make the clamp more flexible the connecting end wall 24 may be provided with one or more notches or openings 32.

As previously suggested the leg 23, due to the resiliency of the clamp, tends to move away from the leg 22 so that when the screw 28 is backed away or loosened the leg 23 moves to the normal position or separates further from the leg 22. The stripped end 26 of the lead wire may then be inserted through the guide opening 25 into position between the two legs 22 and 23, as shown in Figs. 4 to 7 inclusive, the amount it is inserted being limited and determined by the free end of the wire engaging the cross wall 24. Then by merely tightening up the screw the wire is firmly clamped between the legs of the clamp to effectively secure it in this position and make good electrical contact therewith. It will be seen that in making this connection all that is necessary after the screw is loosened is to insert the bared end of the wire from the back or bottom of the fitting through the guide opening 25 as far as it will go, and then tighten up the screw, no wrapping of the wire about the shank of the screw being necessary. This is known in the trade as "bottom wiring." The end of the wire is stopped at the bottom of the spring clamp by the connecting cross wall 24 to automatically limit inward movement of the wire, and this movement is always the same so that the party making the connections always knows just how much of the insulation to strip from the end of the wire, and will obviate stripping too much of the wire. The insulating back or cover plate 13 as it closes the rear open side of the recess 16 may be provided with a suitable opening 32 in alignment with the guide opening 25 in the base or bar 21. This helps to insulate the connector from contact with adjacent parts, and the opening 32 should be spaced the proper distance from the metal mounting yoke 13. The recess 16 opens through the side of the body so that the head 29 of the binding screw 28 is accessible for manipulation from one side of the body, the wire being effectively clamped in the spring clamp of this connector by tightening the screw.

In Figs. 8 to 12 inclusive the device is shown as a connector for the free ends of a plurality of wires, the ends of a pair of these wires being shown so connected in the drawing. In these forms the connector is not supported by insulation as in the first form. In the form of Figs. 8, 9 and 10 the base portion 21*a* instead of being extended beyond one edge of the clamp as is the base 21 to form a bar to which the contact 19 is connected, is terminated at the opposite edges of the clamp, but the legs 33 and 34 corresponding to the legs 22 and 23 are widened somewhat to provide clamping surfaces on opposite sides of the binding screw 28 for the two wires 26. The base 21*a* is also provided with two guide openings 25 for these wires located one on each of the opposite sides of the screw and in alignment with the space between the legs 33 and 34 to guide the bared or stripped ends of these wires into this space. Otherwise the construction and operation is the same as in the forms of Figs. 1 to 7, the connecting cross wall 35 between the outer ends of the legs 33 and 34 forming a limit stop for the free ends of the wires to limit and determine the amount of their insertion into the clamp the same as in the first form. This end wall may have an opening 35*a* to make it more flexible. In this case the setting up or tightening of the single screw clamps both wires between the legs 33 and 34 and the device forms an effective connection between them both mechanically and electrically.

In the form of Figs. 11 and 12, the construction and operation are the same except that the base 21*a* is omitted and the bared free end portions 26 of the wires are inserted directly into the space between the legs 33 and 34 through the open side of the clamp and are then clamped and secured by tightening up the screw 28. In both forms of Figs. 8 to 10 and 11 and 12, the leg 34 tends to move away from the other leg by resilient action of the spring clamp when the screw is loosened to permit ready insertion of the ends of the wires. These connectors could be insulated by wrapping them with tape or by sliding a molded cover over them of suitable insulating material, or they may be used uncovered as desired. If it should be desired to connect a pair of wires to the device of Figs. 1 to 7 instead of the single wire shown the clamp could be widened as shown in Figs. 8 to 10 to provide a clamping surface for a wire on each side of the clamping screw, there being also provided a second guide opening 25 in base 21 for this wire.

Having thus set forth the nature of my invention, I claim:

1. In an electrical fitting, a body of insulating material provided with a recess opening through a side wall of the body, a lead wire connector mounted in said recess comprising a base and a substantially U-shaped spring clamp extending laterally from said base with its open side facing the base, said base being provided with a guide opening for a lead wire in alignment with the space between the legs of the clamp, and a binding post screw extending transversely between the legs of the clamp to clamp a lead wire inserted in said opening between said legs.

2. In an electrical fitting, a body of insulating

material, an electrical contact and a lead wire connector for said contact mounted in the body, said connector comprising a base connected with the contact and a substantially U-shaped spring clamp comprising spaced legs side by side connected at one end by a cross wall, one of said legs being connected at its other end to the base and the other leg being free to move toward and from the first leg, said base being provided with a guide opening for a lead wire in alignment with the space between the legs, and a binding screw extending transversely between the legs of the clamp to clamp a lead wire inserted in said opening between the legs.

3. In an electrical fitting, a body of insulating material, an electrical contact and a lead wire connector for said contact mounted in the body, said connector comprising a base bar connected with the contact and a spring clamp comprising spaced legs side by side connected at one end by a cross wall, the other end of one leg being connected to the bar with the clamp extending laterally therefrom, the other leg of the clamp being movable toward and from the first leg and tending to move away from it, said bar being provided with a guide opening for a lead wire in alignment with the space between the legs of the clamp, and a binding screw extending transversely between the legs of the clamp and threaded in one of said legs to clamp a lead wire in said opening between them, said cross wall between the legs being in alignment with the guide opening and forming a stop for the end of the lead wire to limit its insertion into the clamp.

4. In an electrical fitting, a body of insulating material, an electrical contact and a lead wire connector for said contact mounted in the body, said connector comprising a base bar connected with the contact and provided with an opening for insertion of a lead wire, a spring clamp comprising laterally spaced legs side by side extending laterally from one side of the bar with said opening in alignment with the space between them, one of said legs being connected at one end to the bar and the other leg being free to move toward and from the first leg and tending to move away from it, said legs being connected at their other ends by a cross wall opposite said opening forming a limit stop for the free end of a wire inserted in said opening, and a binding screw extending transversely between said legs and threaded in one of them to clamp a wire in said opening between them.

5. A lead wire connector for electrical devices comprising a base for connection to an electrical contact, a spring clamp extending laterally from one side of said base and comprising laterally spaced legs side by side for insertion of a lead wire between them, one of said legs being connected at one end to the base and one end of the other leg being free to move toward and from the first leg, a cross wall connecting the other ends of the legs, said base being provided with a guide opening for the end of a lead wire in alignment with the space between the legs, said cross wall forming a limit stop for the free end of the wire inserted in said opening, and a binding screw extending transversely between the legs and threaded in one of them to clamp said wire between the legs.

6. A lead wire connector for electrical devices comprising a base bar for connection to an electrical contact, a spring clamp comprising a pair of legs side by side connected at one end by a cross wall, the other end of one leg being connected to the bar with the clamp extending laterally at one side of the bar, the other leg being free to move toward and from the first leg and tending to move away from it, said bar being provided with a guide opening for insertion of a lead wire between the legs, said cross wall forming a limit stop for the free end of said wire, and a binding screw extending transversely between the legs to clamp them on the wire.

7. A lead wire connector comprising a base and a substantially U-shaped spring clamp extending laterally from said base with its open side facing the base, said base being provided with a guide opening for a lead wire in alignment with the space between the legs of the clamp, and a binding post screw extending transversely between the legs of the clamp to clamp a lead wire inserted in said opening between said legs.

8. A lead wire connector comprising a base and a substantially U-shaped spring clamp comprising spaced legs side by side connected at one end by a cross wall, one of said legs being connected at its other end to the base and the other leg being free to move toward and from the first leg, said base being provided with a guide opening for a lead wire in alignment with the space between the legs, and a binding screw extending transversely between the legs of the clamp to clamp a lead wire inserted in said opening between the legs.

9. A lead wire connector comprising a base and a spring clamp comprising spaced legs side by side connected at one end by a cross wall, the other end of one leg being connected to the base with the clamp extending laterally therefrom, the other leg of the clamp being movable toward and from the first leg and tending to move away from it, said base being provided with a guide opening for a lead wire in alignment with the space between the legs of the clamp, and a binding screw extending transversely between the legs of the clamp and threaded in one of said legs to clamp a lead wire in said opening between them, said cross wall between the legs forming a stop for the end of the lead wire to limit its insertion into the clamp.

10. A lead wire connector comprising a base provided with an opening for insertion of a lead wire, a spring clamp comprising laterally spaced legs side by side extending laterally from one side of the base with said opening in alignment with the space between them, one of said legs being connected at one end to the base and the other leg being free to move toward and from the first leg and tending to move away from it, said legs being connected at their other ends by a cross wall opposite said opening, said wall forming a limit stop for the free end of a wire inserted in said opening, and a binding screw extending transversely between said legs and threaded in one of them to clamp a wire in said opening between them.

11. A lead wire connector comprising a base and a substantially U-shaped spring clamp extending laterally from said base, one of the legs of the clamp being attached to the base and the other being movable toward and from the first leg and tending to move away from it, a binding screw having its shank extending transversely between said legs, said base being provided with guide openings on opposite sides of said shank in alignment with the space between said legs to guide the bared ends of lead wires to this space,

and said screw adapted to clamp said legs on the wires inserted between them.

12. A lead wire connector comprising a base, a spring clamp extending laterally from one side of said base and comprising laterally spaced legs side by side for insertion of a lead wire between them, one of said legs being connected at one end to the base and the other leg being free at one end to move toward and from the first leg, a cross wall connecting the other ends of the legs, said base being provided with a pair of laterally spaced guide openings for the ends of lead wires in alignment with the space between the legs, said cross wall forming a limit stop for the free ends of the

wires inserted in said openings, and a binding screw extending transversely between the legs located between said openings and threaded in one of the legs to clamp said wires between them.

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