

April 6, 1937.

R. N. ROWE
SOLDERLESS WIRE CONNECTER

2,076,209

Filed July 1, 1933

Fig. 1.

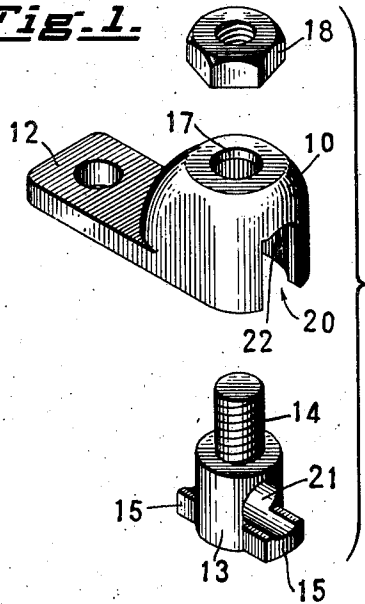


Fig. 2.

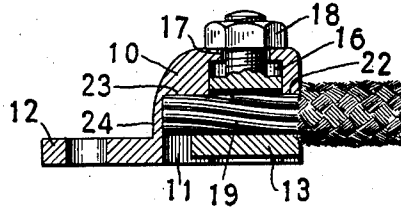


Fig. 3.

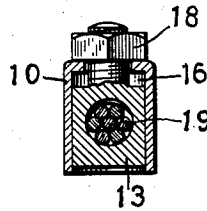


Fig. 4.

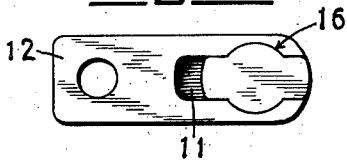


Fig. 6.

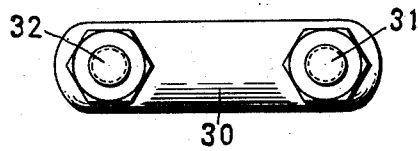


Fig. 5.

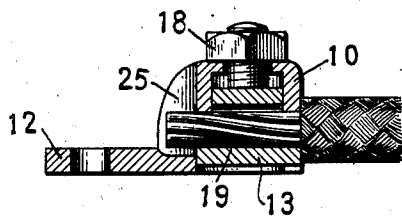


Fig. 7.

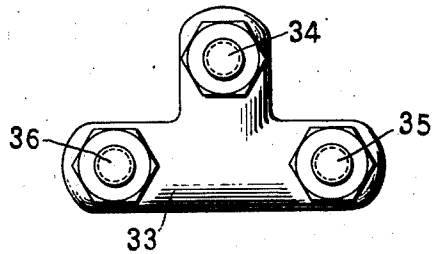
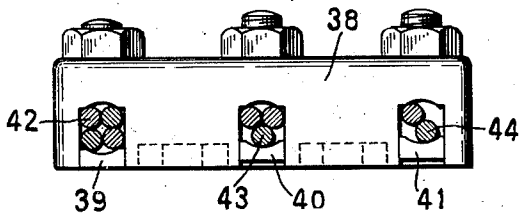


Fig. 8.



INVENTOR
RAYMOND N. ROWE,
BY
Wm. S. Allen
ATTORNEY

UNITED STATES PATENT OFFICE

2,076,209

SOLDERLESS WIRE CONNECTER

Raymond N. Rowe, Plainville, Conn., assignor to
The Trumbull Electric Manufacturing Com-
pany, Plainville, Conn., a corporation of Con-
necticut

Application July 1, 1933, Serial No. 678,623

8 Claims. (Cl. 173-269)

My invention relates to devices for securing or connecting the ends of electric conductors.

One object of the invention is to provide a simple rugged type of construction for anchoring the end of an electric wire or cable without requiring solder.

Another object is to provide a construction of this character in which the electrical connection is effective and reliable.

Another object is to provide a construction which can be used as a wire lug or as an electric terminal or connector.

In carrying out the invention I provide a rigid metallic housing having a recess in its underside and a movable jaw for receiving and clamping the end of the wire in the recess. This jaw is provided with a threaded stem which extends through an opening in the top of the housing on the surface of which a clamp nut is adjustable. The body of the housing may serve as an anchorage lug to be attached to a terminal of an electric switch or to a panel board or the like.

In another form the housing may be provided with a number of recesses and clamping jaws for connecting the ends of a number of wires.

Fig. 1 is an exploded perspective view of the parts of one form of device embodying my invention.

Fig. 2 is a longitudinal sectional view of the parts assembled with a wire or cable end in place.

Fig. 3 is a transverse sectional view of the same.

Fig. 4 is a view of the underside of the assembled device.

Fig. 5 is a longitudinal sectional view showing a modification.

Fig. 6 is a plan view showing a duplex connector.

Fig. 7 is a similar view of a triplex connector. Fig. 8 is an edge view of another form of construction.

The housing 10 is preferably formed of a rigid casting of metal having a recess 11 in its underface and an extension lug 12 adapted to be secured to a support.

The clamping member has a central body portion 13 and a threaded stem 14. The body of the clamping member may have extensions 15 on opposite ends to fit in the lower part of the recess 11. The body part 13 of the clamping member fits in an enlarged portion 16 of the recess and the stem 14 extends through a passage 17 in the top of the housing. A nut 18 is adjustable on the threaded stem for drawing the parts together.

The device is designed to accommodate a cable or wire 19 of any suitable character. In the larger sizes the cable is frequently made up of a number of strands of smaller wire, as shown.

In the form shown in Figs. 1 to 4, inclusive, the end of the housing is open at 20 and the clamping member has a passage 21, as shown in Fig. 1. The parts may be assembled by inserting the threaded stem 14 through the passage 17 and then applying the nut 18. The end of the wire 19 is then inserted through the opening 20 into the passage 21. The nut 18 is then tightened and the wire end 19 is clamped between the bottom of the clamping member 13 and the shoulders 22 and 23. The passage 21 being of somewhat greater diameter than the wire, the wire is free to bend upwardly between the shoulders 22 and 23 as the clamping nut 18 is tightened. The edges of the shoulders 22 and 23 and the extensions 15 thus act as biting jaws which tightly grip the wire so that it is impossible to pull the wire out. An effective electrical and mechanical connection is thus afforded.

In the form shown in Fig. 2 the recess 11 is closed at 24 so as to afford a stop to limit the insertion of the wire and in this construction the recess 11 is open through the full length of the inserted end of the wire to facilitate assembly of the parts.

In the form shown in Fig. 5 the housing is open at 25 so that the end of the wire is visible from the top. In some cases this construction is desirable to facilitate inspection of the assembled parts and to be sure that the wire is fully inserted. The shape of the bottom of the clamping member 13 is such with respect to the recess 11 as to prevent rotation of the clamping member when tightening or loosening the clamping nut.

In the form shown in Fig. 6 the housing 30 has a clamping member at each end with clamping studs 31 and 32 so that the ends of the two wires may be electrically and mechanically connected together without the use of solder.

In the form shown in Fig. 7 the T-shaped housing 33 has clamping members 34, 35 and 36 to facilitate the electrical and mechanical junction of three wires.

In Fig. 8 I have shown a special housing 38 which has the three clamping members 39, 40 and 41 arranged in a row to connect three separate wires or cables. In this case the clamp 39 is shown as holding four wires, clamp 43 is shown as holding three wires, and clamp 44 is shown as holding two wires.

This type of clamping device as herein set

forth will thus be seen to be adapted to clamp various styles and sizes of conductors since the clamping member has a considerable range of adjustment, and the clamping action is such that
 5 when a number of wires are to be inserted in the same connector, the wires are forced against each other which of course increases the effectiveness of the electrical connection.

It is of course desirable to provide means for
 10 preventing rotary or turning movement of the clamping member and while I have shown the projecting lugs 15, 15 which fit into the ends of an elongated recess in the housing for this purpose, it is obvious that the same result may be accomplished in various other ways. For instance
 15 the recess and the clamping member may be either hexagonal or octagonal in cross section or either one of the two parts may be provided with a projection for engagement with a corresponding slot in the other part.

Various other modifications may be made without departing from the spirit or scope of my invention.

From the drawing it will be seen that another
 25 advantage of this invention resides in the provision of the clamping jaw with side walls which are adapted to be engaged by a stranded conductor wire when clamped in position and laterally expanded into good contact with the side
 30 walls of both the clamping jaw member and the side walls of the housing. Having the conductor wire in tight fitting contact with all four walls in the housing recess at spaced apart portions and also having the wire in contact with at least
 35 three walls of the clamping member, makes for better contact than where the conductor wire is in contact with a less portion of all the walls.

I claim:

1. A solderless electrical connector comprising
 40 a metallic housing having a recess open at its lower face and provided with a single end entrance opening and a top passage and closed at the sides and having an abutment wall opposite the end entrance opening, a metallic clamping
 45 member adjustably mounted in said recess and having a threaded stem extending through said passage and having a transversely extending passage through the clamping member adapted to receive the end of a wire inserted through the
 50 end entrance opening in the housing and a clamp nut for drawing the clamping member into said recess, the housing adjacent said abutment being open to allow inspection of the position of the inserted end of the clamped wire.

2. A solderless terminal including a rigid
 55 metallic body having a top opening and a recess forming a clamp housing open at the bottom of the body and having a cable entrance passage leading into one side of the recess, said body having an integral lug extending from the side of
 60 the body opposite the cable entrance passage, a clamp member having an axial screw threaded stem extending through the top opening of the body and having a cable compressing jaw portion, aligned with said stem, slidably but non-rotatably guided within said recess in the body
 65 independently of the stem, said clamping member being provided with a cable passage in line with and of substantially the same diameter as the entrance passage, opposite extensions on said
 70 clamp member for clamping the cable against the housing walls at spaced portions on each side of the clamp member and a nut adjustable on the stem and coating with the top of the body for
 75 drawing the cable compressing jaw portion of the

clamp member into said recess and clamping a cable end in the body of the terminal without shear.

3. A solderless terminal including a rigid metallic body having a recess forming a clamp
 5 housing with a cable entrance into said recess at one side thereof, a clamp member having a threaded stem substantially axially aligned with
 10 said clamp member and body for fitting into said housing in a direction substantially normal to the cable entrance, the stem of the clamp projecting from the body, a nut for threaded engagement with said stem and with the body, said
 15 clamping member having a through recess in substantial alignment with the cable entrance to the body, the portion of the clamping member on the side of its recess opposite said threaded stem projecting in the direction of a cable in opposite
 20 directions from the clamping member and constituting an extension clamping jaw for a cable, the portion of said body opposite that through which the threaded stem projects being open for insertion of said clamping member and its jaw
 25 extension, the body having the walls of its recess and cable entrance opposite the jaw extension adapted to grip a cable extending through said clamping member without shear.

4. A solderless connector including a housing, a
 30 clamping member insertable in said housing, said clamping member having a body portion provided with a recess closed on the top, bottom and sides and into which a conductor wire is adapted to be inserted and a threaded stem extending out of
 35 the housing on the opposite side from that into which the clamping member is insertable, a nut on said threaded stem adapted to cooperate with said housing in clamping a wire in said connector, and means integral with said housing whereby it
 40 may be connected with another conductor, the wire in said clamping member recess being clamped against jaw portions of the housing on each side of the clamping member longitudinally
 45 of the wire, and the sides of the recess in the clamping member being substantially flush with aligned sides of the housing on each side of the clamping member whereby a stranded conductor
 50 may be clamped in said housing and laterally expanded into contact with the sides of the recess in the housing and clamping member as well as with the substantially opposite jaw portions of the housing and clamping member.

5. A solderless connector including a housing, a
 55 clamping member insertable in said housing, said clamping member having a body portion provided with a recess closed on the top, bottom and sides and into which a conductor wire is adapted to be inserted and a threaded stem extending out
 60 of the housing on the opposite side from that into which the clamping member is insertable, a nut on said threaded stem adapted to cooperate with said housing in clamping a wire in said connector, and means integral with said housing whereby it may be connected with another conductor, the
 65 wire in said clamping member recess being clamped against jaw portions of the housing on each side of the clamping member longitudinally of the wire, and the sides of the recess in the clamping member being substantially flush with aligned sides of the housing on each side of the clamping member whereby a stranded conductor
 70 may be clamped in said housing and laterally expanded into contact with the sides of the recess in the housing and clamping member as well as with the substantially opposite jaw portions of the housing and clamping member, extensions on
 75 the housing and clamping member, extensions on

the body of said clamping member adapted to engage the housing with a sliding fit to prevent rotation of said clamping member.

6. A solderless connector including a housing, 5
a clamping member insertable in said housing, said clamping member having a body portion provided with a recess closed on the top, bottom and sides and into which a conductor wire is adapted to be inserted and a threaded stem extending out of the housing on the opposite side 10
from that into which the clamping member is insertable, a nut on said threaded stem adapted to cooperate with said housing in clamping a wire in said connector, and means integral with 15
said housing whereby it may be connected with another conductor, the wire in said clamping member recess being clamped against jaw portions of the housing on each side of the clamping member longitudinally of the wire, and the sides 20
of the recess in the clamping member being substantially flush with aligned sides of the housing on each side of the clamping member whereby a stranded conductor may be clamped in said housing and laterally expanded into contact with 25
the sides of the recess in the housing and clamping member as well as with the substantially opposite jaw portions of the housing and clamping member, an abutment in said housing against which the wire is adapted to be placed, and the 30
housing having an opening between said clamping member and abutment enabling the wire to be seen substantially contiguous said abutment.

7. A solderless connector including a housing, 35
having a transverse recess in which a clamping member is movable, said clamping member having a wire receiving recess enclosed on four sides and movable substantially transverse to said housing recess, said housing also having a wire receiving recess on each side of the clamping 40
member with the side walls thereof stationary and substantially aligned with the side walls of the wire recess in the clamping member, a curved stationary wall in the wire recess of the housing located between said aligned side walls, and against

which a wire is adapted to be clamped when it extends through said clamping member, the clamping member having extensions for closing the wire recess in said housing on one side and provided with a curved wire receiving surface for pressing a wire against said curved stationary wall of the housing, the side walls of the wire receiving recess in both the housing and clamping member being curved to engage a large portion of the surface of a stranded wire so that as the wire is clamped it may expand laterally into contact with the side walls of the clamping member and also the side walls of the housing on each side of the clamping member longitudinally of the wire, said extensions being adapted to facilitate clamping and lateral expansion of a stranded wire on each side of said clamping member. 5 10 15

8. A connector including a housing provided with a recess in which a conductor is adapted to be held, said recess being constituted by longitudinally spaced pairs of side walls, longitudinally spaced laterally curved abutments between said side walls, longitudinally spaced laterally curved conductor clamping means for pressing a conductor against each abutment and laterally expanding a stranded conductor against said side walls, said conductor clamping means being provided with a body portion intermediate said spaced clamping means, said body portion having a conductor receiving recess with side walls in substantial alignment longitudinally with said housing side walls and a conductor clamping surface between said body side walls and in substantial longitudinal alignment with said spaced clamping portions, 20 25 30 35
and means for applying a clamping force between said housing and body portion whereby a stranded conductor is clamped on four sides at spaced portions within said housing and is in contact with at least three sides of the body portion of the clamping means intermediate said spaced portions. 40

RAYMOND N. ROWE.