May 13, 1941. H. G. WARNKE 2,241,687

CABLE ASSEMBLY

Filed Sept. 9, 1938

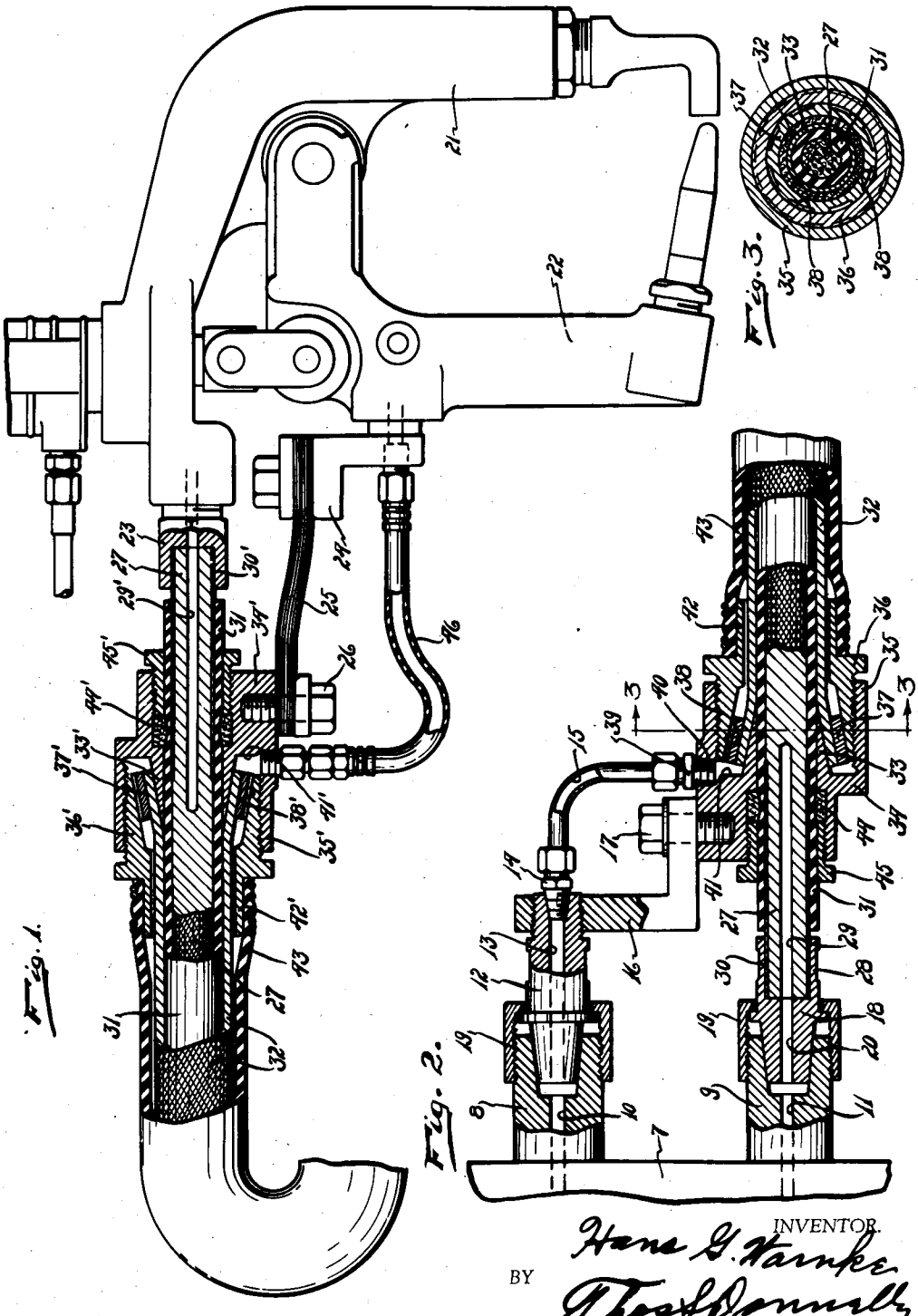


Fig. 1.

Fig. 2.

Fig. 3.

INVENTOR.
Hans G. Warnke

BY
Thos. J. Donnelly
ATTORNEY.

Patented May 13, 1941 2,241,687

UNITED STATES PATENT OFFICE

2,241,687

CABLE ASSEMBLY

Hans G. Warnke, Detroit, Mich.

Application September 9, 1938, Serial No. 229,095

6 Claims. (Cl. 174—15)

My invention relates to a new and useful improvement in a cable assembly adapted primarily for use in connection with a welding gun electrically connected to a transformer.

With the conventional type of construction a pair of separate cables is used connecting from the transformer to the welding gun. In the use of such a connection many undesirable features are encountered, among which is a lessening of flexibility and the provision of a construction which is cumbersome and difficult for the user to operate. It is quite customary where a pair of cables is used, that these cables be connected by suitable clamps but whether they are connected by clamps or not, there is a jerking of the cables which is effected upon the turning on of the current. The connection of the cables together renders them more stiff and thus in turn lessens the flexibility. It has also been noted that in the use of separate cables, there is a considerable current loss and the present invention is intended to increase the current capacity by eliminating this loss.

The present invention also is intended to afford a connection which is possessed of maximum flexibility, ease of handling and great durability.

It is also the purpose of the present invention to provide a compact, efficient structure having the cables water cooled and provided with such connections as to assure a watertight construction.

Other objects will appear hereinafter.

The invention consists in the combination and arrangement of parts hereinafter described and claimed.

The invention will be best understood by a reference to the accompanying drawing which forms a part of this specification and in which,

Fig. 1 is a side elevational view of the invention showing a connecting end with parts broken away and parts shown in section.

Fig. 2 is a longitudinal, vertical, central, sectional view of the end of the invention opposite to that shown in Fig. 1 with parts shown in side elevation.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2.

In the drawing I have shown Fig. 1 separated into parts, the connection being indicated by the elongated arrow. In this view I have indicated the invention used with a transformer 7 projecting outwardly from which are the bosses 8 and 9 through which are extended the passages 10 and 11, respectively. Secured on the boss 8 by means of the collar 19, is a metallic fitting 12 having a passage 13 formed therein communicating through the fitting 14 with the passage 15. Mounted on the fitting 12 is the L-shaped bracket 16 having an opening for reception of the bolt 17, the boss 8 connecting to one side of the secondary coil of the transformer, the boss 9 connecting to the opposite side of the secondary coil of the transformer and carrying the fitting 18 secured therethrough by the collar 19, this fitting 18 having a central passage 20 formed therethrough.

The welding gun illustrated is of the conventional type carrying a pair of cooperating electrodes 21 and 22 which are usually formed hollow for the reception of water used for cooling purposes. A connector 23 is connected to the electrode 21 and a bracket 24 connected to the electrode 22 carries the metallic connector 25 through which the bolt 26 may be extended.

In the construction illustrated, I provide a central cable 27 formed from a metallic mesh or weave, this cable being formed from metal now commonly used for this purpose. The cable 27 is connected at one end in contact with the socket 28 carried by the fitting 18 and in which the end of the cable 27 is projected, there being a central passage 29 formed in the cable 27 extending inwardly from one end a slight distance. Covering the cable 27 adjacent this end is a sheathing 30 impervious to water, which extends inwardly of the flexible covering 31 formed from rubber or the like to provide a waterproof or insulated covering or sheathing for the cable 27. Embracing this rubber covering 31 is a tubular cable 32 formed from a wire mesh or weave which is fitted at one end over the tapered sleeve 33 projecting outwardly from the fitting 34, this tapered sleeve 33 being enclosed by the internally threaded neck 35 into which is threaded a jam nut 36 adapted for pressing the collar 37 onto the neck 33 and securing the cable 32 in close contact on the neck 33. This collar 37 has circumferentially spaced axially directed grooves 38 formed in its periphery. The pipe 15 is connected by the fitting 39 in the pocket 40 leading into the channel 41 so that water may be conducted through the pipe 15 into the channel 41 and allowed to pass through the grooves 38 into contact with the cable 32. Extending outwardly from the jam nut 36 is a tubular neck 42 over which is secured one end of a flexible waterproof covering such as a hose 43 so that the water flowing through the passage 41 may traverse the length of the hose 43 and serve to cool the cable 32. To prevent leakage of water at the periphery

or sheathing of the covering 31, I have provided a packing 44 pressed by the jam nut 45 threaded into one face of the fitting 34. This fitting 34 is connected by means of the bolt 17 and the bracket 16 to the fitting 12 thus establishing a connection between the cable 32 and the other end of the secondary coil of the transformer.

Connection of these cables to the electrodes is made in a somewhat similar manner. The opposite end of the cable 27 is provided with a bore 29' extending inwardly a short distance from one end thereof and this portion of the cable being enclosed by a sheathing 30', this end of the cable being securely connected to the fitting 23. A fitting 34' is provided through which the cable 27 and its flexible covering 31 project. This fitting 34 is provided with a tapered neck 33' over which is fitted the opposite end of the tubular cable 32 and held in position by means of the collar 37', pressed by the jam nut 36' threaded into the internally threaded collar 35' carried by the fitting 34'. A neck 42' projects outwardly from the jam nut 36' and secured over this neck is the opposite end of the waterproof insulated covering or hose 43. A jam nut 45' threaded into one face of the fitting 34' serves to press the packing 44' so that leakage of water around the end of the waterproof insulated covering 31 may be prevented. This fitting 34' is electrically connected by means of the bolt 26 and the connection 25 to the electrode 22. The pipe 46 serves to conduct the water from the fitting 34' to the electrode 22. In this way I provide a unitary structure in which one cable is embraced by the other so that the use of parallel separate cables is dispensed with and consequently, the disadvantages referred to are avoided. By having one cable embracing the other a more efficient economical structure is provided and one which is easily operated and possessed of a maximum efficiency. The jerking of the cable upon the turning on of the current is eliminated and it is believed obvious that I have provided a very effective and simple means of connection at the opposite ends.

While I have illustrated and described the preferred form of construction, I do not wish to limit myself to the precise details of structure shown, but desire to avail myself of such variations and modifications as may come within the scope of the appended claims.

What I claim as new is:

1. An electrical connecting cable comprising a non-tubular conducting core; an insulating covering embracing said core in snug relation; a hollow conducting member embracing said insulating covering in snug relation; and another cover of insulation embracing said hollow conductor in spaced relation thereto to provide a water channel around said hollow conductor.

2. An electrical connecting device of the class described comprising an elongated non-tubular electrical conducting core; a covering of insulation embracing said core and engaging the same in snug relation, said core projecting beyond the end of said insulation, a tubular electrical conducting member embracing said insulation in snug relation, said insulation projecting beyond the end of said tubular conducting member; and a layer of insulation embracing said tubular conducting member in spaced relation thereto, said tubular conducting member projecting beyond the end of said last named layer of insulation.

3. An electrical conducting cable of the class described comprising a non-tubular electrical conducting core; a layer of insulation embracing said core, said core projecting beyond the end of said insulation: a tubular conducting member embracing said layer of insulation, said layer of insulation projecting beyond the end of said tubular conducting member and an outer layer of insulation embracing said tubular conducting member, in spaced relation thereto, said tubular conducting member projecting beyond the end of said outer layer of insulation.

4. In a device of the class described, a conducting cable comprising a non-tubular metallic electrical conducting core; a layer of insulation snugly embracing said core, said core projecting beyond the end of said insulation; and snug fitting tubular means embracing said projecting end of said core, said means being impervious to liquid.

5. In a device of the class described, a conducting cable comprising a non-tubular metallic electrical conducting core; a layer of insulation snugly embracing said core, said core projecting beyond the end of said insulation; tubular means embracing said projecting end of said core, said means being impervious to liquid; a tubular electrical conductor embracing said layer of insulation, said insulation projecting beyond the end of said tubular conductor; and an outer layer of insulation embracing said tubular conductor in spaced relation, said tubular conductor projecting beyond the end of said outer layer of insulation.

6. An electrical connecting device of the class described comprising: an elongated cable embodying a non-tubular metallic core; a layer of insulation embracing said core in snug relation, said core projecting beyond the end of said layer of insulation; a tubular conductor embracing said layer of insulation; said layer of insulation projecting beyond the end of said tubular conductor; an outer layer of insulation embracing said tubular conductor in spaced relation thereto; a fitting fixedly mounted on said first named layer of insulation adjacent the end thereof; means for connecting the end of said tubular conductor to said fitting; and means for connecting the end of said outer layer of insulation to said fitting, said fitting having passages therein communicating with the interior of said outer layer of insulation for conducting a cooling fluid into and from the space in said outer layer of insulation surrounding said tubular conductor.

HANS G. WARNKE.