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STRESS-RELIEVED STRANDED WIRE STRUCTURE AND
METHOD OF MAKING THE SAME
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FIG. 3.

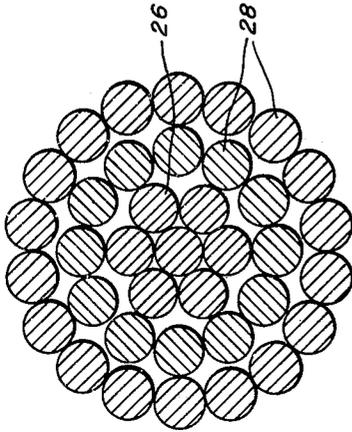


FIG. 1.

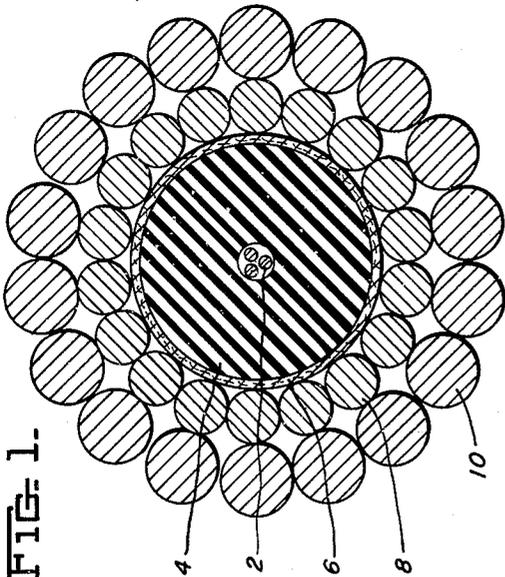
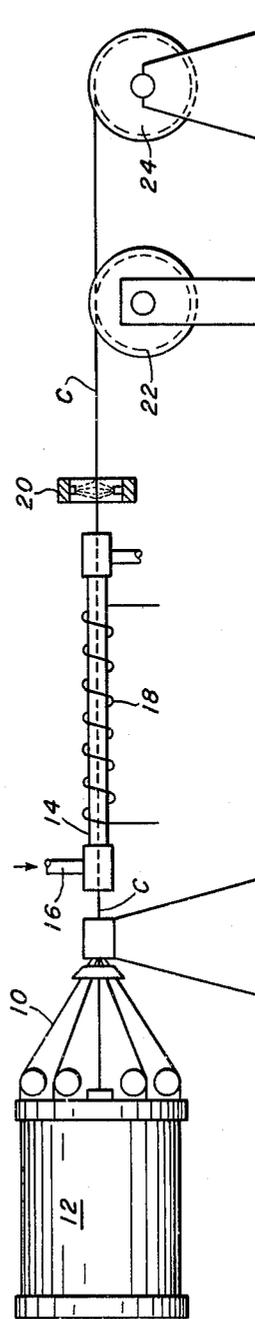


FIG. 2.



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STRESS-RELIEVED STRANDED WIRE STRUCTURE AND METHOD OF MAKING THE SAME

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5 Claims. (Cl. 174-108)

This invention relates to a stranded wire structure and to a method of making the same and is more particularly directed to a stranded wire structure having both ferrous and non-ferrous material included therein. One such type of structure includes an electric conductor surrounded by steel armor wires, with insulation between the conductor and armor wires. In making up this structure the armor wires are performed in the stranding operation. We have found that in many instances the performing is not complete and that the armor wires will then tend to broom when cut. Also, in use, the armor wires may tend to separate from the member therebeneath so that the cable is "spongy."

It is therefore an object of our invention to provide a stranded wire structure having a core and stranded wire covering made of ferrous and non-ferrous material, in which the ferrous material is stress relieved after forming to overcome the difficulties set forth above.

Another object is to provide a method of making such a stranded wire structure.

These and other objects will be more apparent after referring to the following specification and attached drawings, in which:

FIGURE 1 is a view of an armored cable made according to our invention;

FIGURE 2 is a schematic view of apparatus used in the practice of our invention; and

FIGURE 3 is a view, similar to FIGURE 1, showing another type of stranded wire structure made according to our invention.

Referring more particularly to FIGURE 1 of the drawings, reference numeral 2 indicates an electric conductor which is preferably made of copper and which may be either a single element or a stranded structure as shown. Electrical insulation 4 surrounds the conductor 2. This insulation may be rubber, neoprene or other material commonly used for this purpose. A heat shield layer 6 surrounds the insulation 4 and may be made of any material which can withstand heat of between 600 and 1100° F. and has heat insulating value. It has been found that cotton, Teflon, and asbestos are suitable for this purpose as long as the heat is applied only for a short period of time. Two layers 8 and 10 of hard drawn armor wires are applied over the barrier 6 in the usual manner with one layer being of right hand lay and the other layer being of left hand lay.

In carrying out our method, the various layers of cable C assembled in the usual manner in a strander 12 are fed through a conduit 14 which has an inlet 16 for nitrogen or other inert gas. The cable C is heated by means of an induction coil 18 which surrounds the conduit 14. Depending upon the type of steel used in the armor the temperature to which the armor is heated may vary between 600 and 1100° F. The higher temperatures will be used with stainless steel. Immediately after leaving the conduit 14 the armor wires are quenched by passing through a water spray 20. The cable then passes around a capstan 22 to a reel 24. It is preferred that only sufficient tension be applied to the cable between the strander 12 and capstan 22 to keep it taut.

In some cases it is desirable to only partially cure the

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insulation prior to its passing through the induction coil 18 so that the heat generated in the process will be used to complete the curing and will not over-cure the insulation. This will be particularly true when using neoprene and certain plastic insulations. It has been found that the armor wires need be subjected to the heat for only a very short period of time, such as one second. The cable made according to our method will have at least the outer wires of the armor stress relieved so that upon cutting of the cable these armor wires will remain in close contact with the underlying structure and will not broom out. The elastic limit of the entire cable is also increased by about 20% to 25%. The operation need not be performed in conjunction with the stranding operation, but can be separately performed on the completed cable.

While we have found our method particularly suitable for armor cable of the type described above, it will also function with other types of stranded wire structures. Another type of cable made according to our invention is shown in FIGURE 3 wherein a center strand 26 made up of galvanized hard drawn steel wires is surrounded by two layers of stranded wires 28 made of non-ferrous material such as aluminum or copper. In making this stranded wire structure it is formed in a strander in the usual manner, after which it is passed through the apparatus of FIGURE 2 so that the wires of the center strand 26 are stress relieved. In some instances the water quench 20 may be omitted.

While two embodiments of our invention have been shown and described it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

We claim:

1. A stranded wire structure comprising a core member, and a stranded wire covering around said core member, one of said core members and stranded wire coverings being made of hard drawn steel wires stress relieved at a temperature between 600 and 1100° F. after stranding, and the other of said core members and stranded wire coverings being made of a material of the class consisting of aluminum and copper.

2. A stranded wire structure comprising a core member including a material of the class consisting of aluminum and copper, and a hard drawn stranded steel layer surrounding said core member, said layer being made of hard drawn steel wires stress relieved at a temperature between 600 and 1100° F. after stranding.

3. A stranded wire structure comprising a conductor of the class consisting of aluminum and copper, an electrical insulation surrounding said conductor, a heat shielding material surrounding said insulation, and a stranded wire covering around said shielding material, said stranded wire covering being made of hard drawn steel wires stress relieved at a temperature between 600 and 1100° F. after stranding.

4. The method of making a stranded wire structure which comprises providing a non-ferrous core member of the class consisting of aluminum and copper, stranding hard drawn steel wires around said core member, and then heating the steel wires to a temperature of between 600 and 1100° F. to stress relieve the same.

5. The method of making a stranded wire structure which comprises providing an electrical conductor, placing an electrical insulation around said conductor, placing a heat shielding material around said insulation, stranding hard drawn steel wires around said heat shielding material, and then heating the steel wires to a temperature of between 600 and 1100° F. to stress relieve the same.

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