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3,035,403

STRANDED WIRE STRUCTURES

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FIG. 1

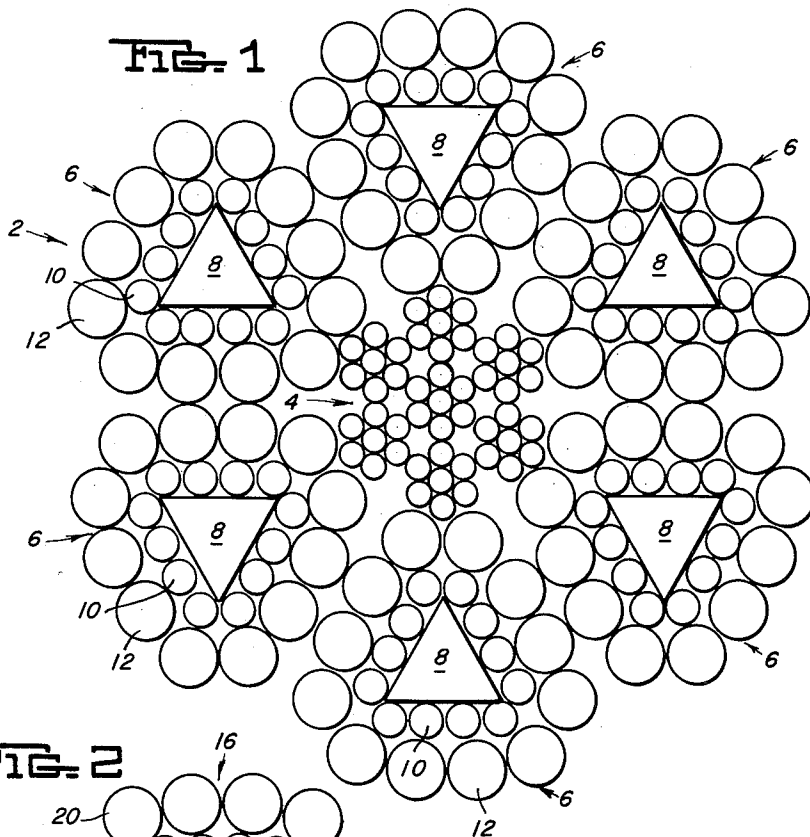
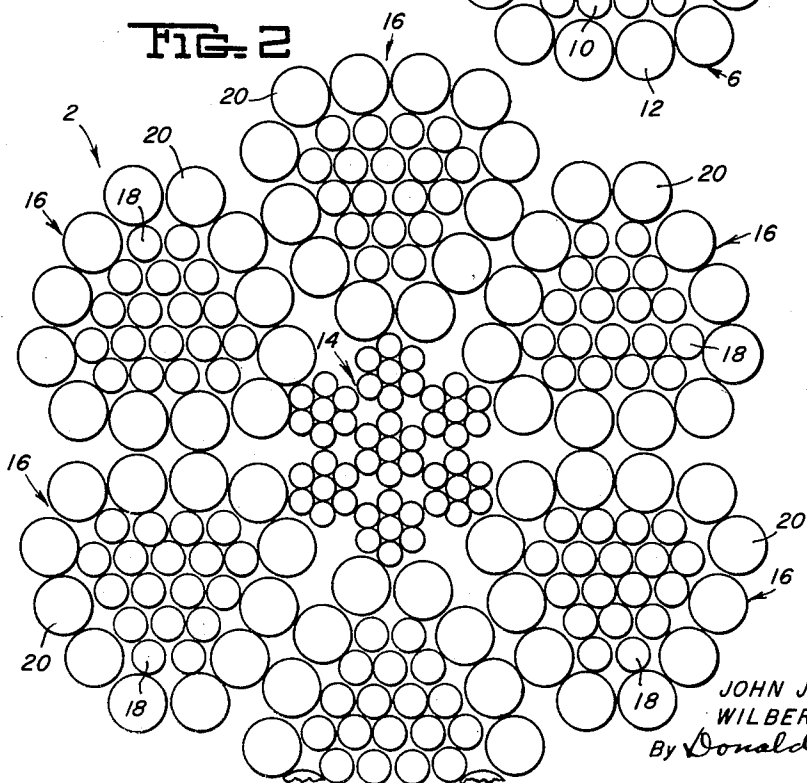


FIG. 2



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## STRANDED WIRE STRUCTURES

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6 Claims. (Cl. 57-145)

This invention relates to stranded wire structures and more particularly to such structures made from steel wires. Normally when making such structures, the wires are cold drawn to finish size and stranded together in cold drawn condition, or the cold drawn wires may be galvanized before stranding. This stranded wire structure is normally called a strand and stranded wire structures commonly known as wire rope may be made from a plurality of strands. In some types of rope or strand there is a tendency for the inner wires to break before the outer wires. This is undesirable because the rope becomes weakened without any exterior sign of such weakening. Therefore, the rope may break in service, where as, it would have been removed from service if the weakening had been observed.

It is therefore an object of our invention to provide a stranded wire structure in which the wires may be processed in such a manner as to control which wires will fail first.

Another object is to provide a stranded wire structure having a higher breaking strength than that normally present in structures of the same size.

Still another object is to provide a method of making such an improved stranded wire structure.

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

FIGURE 1 is a view, to an enlarged scale, of a preferred embodiment of our invention; and

FIGURE 2 is an end view of a second embodiment of our invention.

Referring more particularly to FIGURE 1 of the drawings, reference numeral 2 indicates a wire rope in which our invention has proved particularly satisfactory. As shown, the wire rope 2 includes a 7 x 7 steel core 4 surrounded by six 25 wire strands 6. Each strand 6 includes a generally triangular steel center core 8 surrounded by a layer of twelve steel wires 10 and an outer layer of twelve steel wires 12 surrounding the layer of wires 10. The 7 x 7 core may be replaced by other types of core members, made either of steel wires, jute or other material.

In making up the rope the wires are cold drawn in the usual manner and, except for wires 10, will remain in cold drawn condition. The wires 10 after being cold drawn are stress relieved. Depending upon the type of steel, the temperature of stress relieving may vary between 700° and 1100° F. The wires are then stranded together in the usual manner and the strands 6 stranded around the center core 4 also in the usual manner. The wires 10 and 12 are the main load carrying members of the wire rope and, prior to our invention, if the rope failed it was due to initial failure of the wires 10. In a rope constructed and formed according to our invention failure of the wires 10 does not occur, but the initial failure is in the core 8. This does not greatly weaken the wire rope and any subsequent failure is then in one of the wires 12 where it can be readily observed.

We have found that the breaking strength of the entire rope is substantially increased by the practice of our invention. For example, in a 1" rope made of AISI type 304 stainless steel, the wires 10 were stress relieved at a temperature between 875 and 925° F. (preferably 900° F.)

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for four hours. This increased the breaking strength of the rope from 72,640 pounds to 87,550 pounds. In a similar 1½" rope the breaking strength was increased from approximately 155,000 pounds to 175,000 pounds. It is believed that the invention is particularly suitable with ropes made of stainless steel, but the invention may also be used with ropes made of carbon steel. With such steels the stress relieving temperature is much lower and may range from 650° to 800° F. With other steels the stress relieving temperature may be as high as 1100° F. A similar ¾ in. wire rope made of Improved Plow steel, but with a 3-wire strand substituted for the triangular core 8, had a breaking strength of 87,180 pounds when all the wires were cold drawn and a breaking strength of 88,680 pounds when the wires 18 were stress relieved at 700° F.

In the embodiment of FIGURE 2 a 7 x 7 wire rope core 14 is surrounded by six steel strands 16, each having a core made up of eighteen wires 18 surrounded by a layer of twelve wires 20. A ¾ in. Lang lay wire rope of this type made of type 304 stainless steel and all wires cold drawn had a breaking strength of 45,480 pounds as compared to a breaking strength of 58,800 pounds when the wires 18 were stress relieved at 900° F.

While several 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 center core, a layer of steel wires surrounding said core, each of said steel wires being in stress relieved condition, and a layer of cold drawn steel wires surrounding said first layer of steel wires.

2. A stranded wire structure consisting of a generally triangular core, a layer of steel wires surrounding said generally triangular core, each of said steel wires being stress relieved, and an outer layer of cold drawn steel wires surrounding said first layer of steel wires.

3. A wire rope comprising a center core and six strands surrounding said center core, each of said strands consisting of a generally triangular core, a layer of steel wires surrounding said generally triangular core, each of said steel wires being stress relieved, and an outer layer of cold drawn steel wires surrounding said first layer of steel wires.

4. A stranded wire structure comprising a layer of cold drawn steel wires, and a plurality of steel wires within said layer of steel wires with at least part of said last named steel wires contacting the layer of steel wires, the said contacting steel wires of said plurality of steel wires being in stress relieved condition.

5. A stainless steel wire rope comprising a center core and a plurality of strands surrounding said center core, each of said strands including an outer layer of stainless steel wires, and a plurality of stainless steel wires within said layer of steel wires with at least part of said last named steel wires contacting the outer layer of steel wires, the said contacting steel wires of said plurality of steel wires being in stress relieved condition, said outer layer of steel wires being in cold drawn condition.

6. The method of making a stranded wire structure which comprises cold drawing steel wires to the desired size, stress relieving only a certain number of said wires, stranding said wires together in a plurality of layers with the cold drawn wires in the outer layer and the stress relieved wires in the layer adjacent the outer layer.

References Cited in the file of this patent

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