Nov. 8, 1966 W. A. LUCHT ET AL 3,283,494

METHOD OF MAKING STRANDS

Original Filed April 10, 1962

FIG. 1

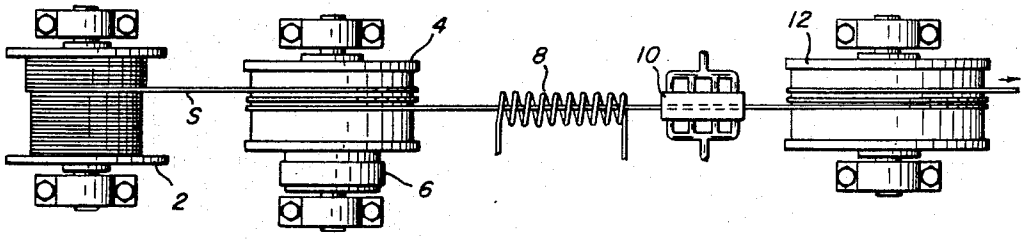


FIG. 2

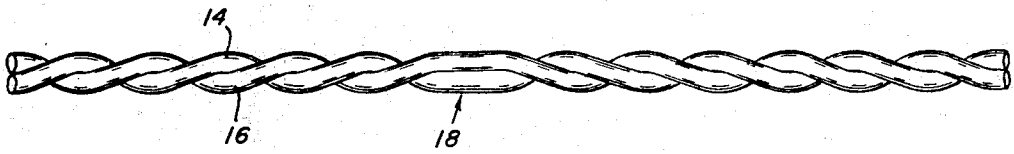
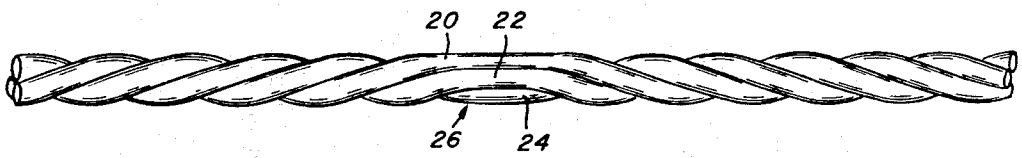


FIG. 3



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METHOD OF MAKING STRANDS

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Original application Apr. 10, 1962, Ser. No. 186,439. Divided and this application Sept. 24, 1965, Ser. No. 489,961

4 Claims. (Cl. 57—156)

This application, which is a division of our co-pending application, Serial No. 186,439, filed April 10, 1962, and now abandoned, relates to a method of making strands, and more particularly to making strands without a center wire, such as two and three wire stone sawing strands. In making strands such as stone sawing strands the wires of the strand are spiralled together either in one direction or with reversals at intervals. It has been found that the strands as formed are not straight, but instead have considerable bend therein, which makes them unsuitable for their intended purpose. It has, therefore, been necessary to pass the strand through a series of straightening rolls. When the strands come out of the straightening rolls the straightness is considerably improved, but the wires of the strand are not in continuous contact with one another throughout the length of the strand. For many uses, this is undesirable; for example, in stone sawing strands this causes non-uniform wear so that the strands will wear out more quickly and thereby the stone will be cut more slowly. This condition is aggravated at the reversal points. Thus, the strands are either not straight or if straightened they will not have their wires in contact throughout their length.

It is therefore an object of our invention to provide a method of making a straight wire strand in which the wires of the strand are of the same length with the wires being in contact with each other throughout their length.

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

FIGURE 1 is a schematic plan view of apparatus suitable for carrying out our method;

FIGURE 2 is an elevation of a two-wire stone sawing strand made according to our invention; and

FIGURE 3 is an elevation of a three-wire stone sawing strand made according to our invention.

Referring more particularly to the drawings, reference numeral 2 indicates a pay-off reel for receiving a strand S such as a two or three-wire stone sawing strand. The strand S passes from the pay-off reel 2 to a tension drum 4 around which several wraps of the strand are made. A brake band 6 on the drum 4 provides the necessary back tension. From the drum 4 the strand S passes through an induction heating coil 8 and then through a quench ring 10 to a haul-off drum 12 around which is is wrapped several times. The strand S then passes to a take-up mechanism, not shown, or it may be cut to the desired length.

According to our invention a stone sawing strand is made in the usual manner as by the machine shown in Simcoe Patent No. 2,897,646, dated August 4, 1959. As shown in FIGURE 2 the strand consists of two wires 14 and 16 spiralled together with sections of right hand lay and sections with left hand lay connected at intervals by means of reversals 18, one of which is shown. In the case of the three-wire strand shown in FIGURE 3 three

wires 20, 22 and 24 are spiralled together with sections of right hand lay and sections with left hand lay connected at intervals by means of reversals 26, one of which is shown. As stated above the wires stranded together in the usual manner will have considerable bend therein. After the strand is formed it may pass directly to the tension drum 4 or it may be coiled and then placed on the pay-off reel 2. Normally such strands are made of .50 to .90% carbon steel. After several wraps of the wire are laid around the drum 4 it is directed through the heating coil 8 and quenching coil 10 to the haul-off drum 12. The tension applied to the strand by means of the drums 4 and 12 and the temperature applied to the strand by means of the heating coil 8 is such that the steel will flow uniformly and at least some of the wires will be elongated so that all the wires in the strand will have substantially the same length. In the case of .50 to .90% carbon steel the temperature must be between 600 and 950° F., the upper temperature limit being below the lower critical temperature of the steel.

With a .187 inch three-wire concrete reinforcing strand the procedure is as follows:

The strand S is heated to 750° F. while applying a back tension of between 650 and 1000 lbs. as the strand travels through the coil 8 at approximately 140 ft. per minute. Immediately after leaving the inductor coil 8 the strand S is quenched either by air or water jets.

Thus it is seen that tension is applied to such a degree that the elastic limit of the wire is exceeded so that the length of the component wires are equalized by stretching. Preferably the back tension should be just under the strand breaking strength. This results in a straight strand with each of the wires having substantially the same length and being in contact with each other throuhgout the strand length.

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. The method of making a straight multi-wire stone sawing strand which comprises stranding a maximum of three .50 to .90% carbon steel wires together with the wires in the strand being of substantially the same cross-section and of different lengths, passing the strand through an induction coil to heat it to a temperature of between 600 and 950° F. and subjecting the strand while so heated to sufficient tension to elongate at least some of the wires and to make all the wires substantially the same length.

2. The method of making a straight multi-wire strand which comprises stranding steel wires together with the wires in the strand being of different lengths, heating the strand to a temperature of between 600 and 950° F. and subjecting the strand while so heated continuously to tension above the elastic limit to elongate at least one of the wires and to make all the wires substantially the same length.

3. The method of making a straight multi-wire strand which comprises stranding steel wires together with the wires in the strand being of different lengths, passing the strand through an induction coil to heat it to a temperature at which the steel flows uniformly but below the lower critical temperature, and subjecting the strand while so heated continuously to sufficient tension above the elastic limit to elongate at least one of the wires and to make all the wires substantially the same length.

4. The method of making a straight multi-wire strand which comprises stranding a maximum of three steel wires together with the wires in the strand being of substantially the same cross-section and of different lengths, passing the strand through an induction coil to heat it to a temperature at which the steel flows uniformly but below the lower critical temperature, and subjecting the strand while so heated continuously to sufficient tension above the elastic limit to elongate at least one of the wires and to make all the wires substantially the same length.

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