This invention relates to ropes or cables and, while not limited thereto, relates more particularly to non-spinning ropes.

In various operations it is customary to use a single rope attached directly to the load, and it has been found necessary heretofore even when the so-called non-spinning ropes of the prior art were used, to load the ropes lightly in order to prevent spinning of the load.

Heretofore so-called non-rotating rope has generally consisted of six strands of one lay surrounded by twelve strands of the opposite lay, the rotating tendency of the rope being taken care of for light loading by the opposition of the six inner strands versus the twelve outer strands. Since the number of outer strands is materially greater than the number of inner strands, it is obvious that under heavy loading the tendency to rotate is materially increased, because six strands cannot control the rotating tendency of twelve strands.

The present invention has for its object the provision of a non-spinning rope structure in which the six inner strands will offset substantially all the rotating tendency of the twelve outer strands.

Figure 1 is a perspective view of a piece of rope with one end cut away to show the core and the inner series of strands.

Figure 2 is a sectional view through the rope of Figure 1.

Referring more particularly to the drawings, the numeral 2 designates the inner series of six strands which are wound in one direction over a core 3, and an outer series of strands 4 is wound about the inner series 2 as a core in the opposite direction. The wires which make up each of the individual strands 2 are twisted in the same direction as the lay of the strands, but in the strands 4 the individual wires are shown laid in the opposite direction to the lay of the strands.

The number of strands in the outer series are twice the number of the inner series. However, since the inner series of strands has the wires as well as the strands all laid in one direction, as above described, this series will have a tendency to untwist very much faster than the outer series of strands which have the wires laid in the opposite direction than the lay of the strands, thereby counteracting to a degree the spinning action of the rope.

In order to further increase the tendency of the inner series of strands to completely counteract the untwisting action of the outer series the wires of the six inner strands preferably have a greater diameter than the wires of the outer series of strands and the wires of the inner strands have a materially greater tensile strength.

It has been found that when the diameters of the wires comprising the inner strands are sufficiently larger than the diameter of the wires of the outer strands so that the outer series of strands have an area ratio to the area of the inner series of strands of approximately 63 to 37, and when the tensile strength of the inner series of strands is increased from 10 to 30 per cent, a rope is provided which is substantially non-spinning under all load conditions.

It will, of course, be understood that I do not wish to be limited to the laying up of the wires of the individual wires of the strands in the manner described above, since the strands may be composed of wires laid up in any usual manner. The lay of the strands is the main controlling factor in the spinning of the rope, and the increased area and tensile strength of the inner series of strands are the main features in counteracting this spinning tendency of the rope.

A true non-spinning rope is one in which the inner and outer series of strands have an equal metallic area so that there is a complete balance between said series of strands. In general commercial practice, however, what the art knows and accepts as non-spinning rope is a rope which has oppositely said inner and outer series of strands which are partly balanced so as to resist rotation to a material degree under load.

Due to the fact that in general commercial practice a perfectly balanced rope is very seldom if ever made, there is generally some rotation of the commercial so-called non-spinning rope under load. The effect of this...
rotation is usually to lengthen the lay on the outside series of strands, and to close the lay on the inside. The result is that a heavier load or excess load is placed on the inner series of strands.

Manufacturers are constantly being called upon to furnish the so-called non-spinning rope with safety factors of three to four. With the ordinary non-spinning rope construction it will be seen that a slight rotation of the rope will throw enough excess load on the inner series of strands to cause them to fail.

By making the inner series of strands of wires having a greater cross-section and higher tensile strength or even of a higher tensile strength alone, as described above, the objections to the prior art non-spinning ropes are overcome, since the inner strands will have a greater tendency to oppose the rotation of the outer series of strands and at the same time will have sufficient excess strength to carry the excess load delivered thereto when the rope rotates under load.

It will, of course, be understood that wires of high tensile strength are harder and have a greater resiliency than wires of lesser tensile strength and, therefore, the inner series of strands composed of the higher tensile strength wires will have a greater tendency to oppose the rotation of the outer series of strands than they would if the inner and outer series of strands were composed of wires having equal tensile strength.

While I have shown and described a specific embodiment of my invention, it will be understood that I do not wish to be limited thereto, since various combinations of lay may be used in laying up the wires of the strands and the strands themselves, various numbers of strands may be used to form the rope, and other and various modifications may be made without departing from the scope of my invention as defined in the appended claims.

I claim:
1. A wire rope composed of an inner series of strands laid up in one direction, and an outer series of strands laid up around said inner series of strands as a core in the opposite direction, said strands each being composed of a plurality of wires, the wires of said inner series of strands being of a greater cross-section and resiliency than the wires of the outer series of strands so as to counteract the rotating tendency of said outer series of strands, and the wires of said inner series of strands also being of a materially higher tensile strength than the wires of said outer series of strands so that they can assume any excess load caused by unwinding of the outer strands.

3. A wire rope composed of an inner series of strands laid up in one direction and an outer series of strands laid up around said inner series of strands as a core in the opposite direction, said strands each being composed of a plurality of wires, the wires of said inner series of strands being of a greater cross-section than the wires of the outer series of strands so that the outer series of strands have an area ratio to the area of the inner series of strands of approximately 63 to 37, and the wires of said inner series of strands having a tensile strength of 10 to 30 per cent, greater than the tensile strength of the wires of the outer series of strands.

In testimony whereof, I have hereunto set my hand.

JAMES FORREST HOWE.