

(No Model.)

A. S. HALLIDIE.
WIRE ROPE AND CABLE.

No. 251,114.

Patented Dec. 20, 1881.

FIG. 1.

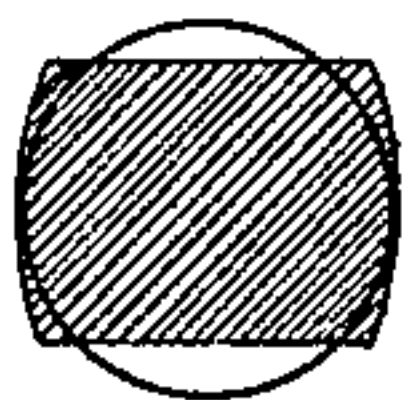


FIG. 2.

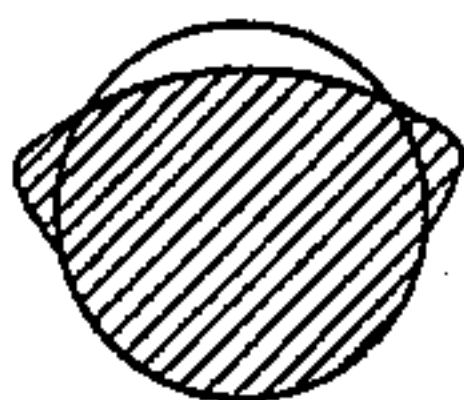


FIG. 3.

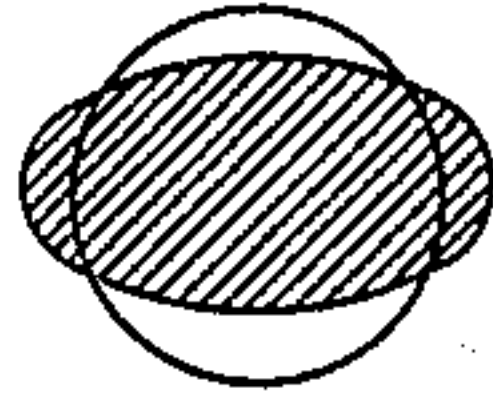


FIG. 4.



FIG. 5.

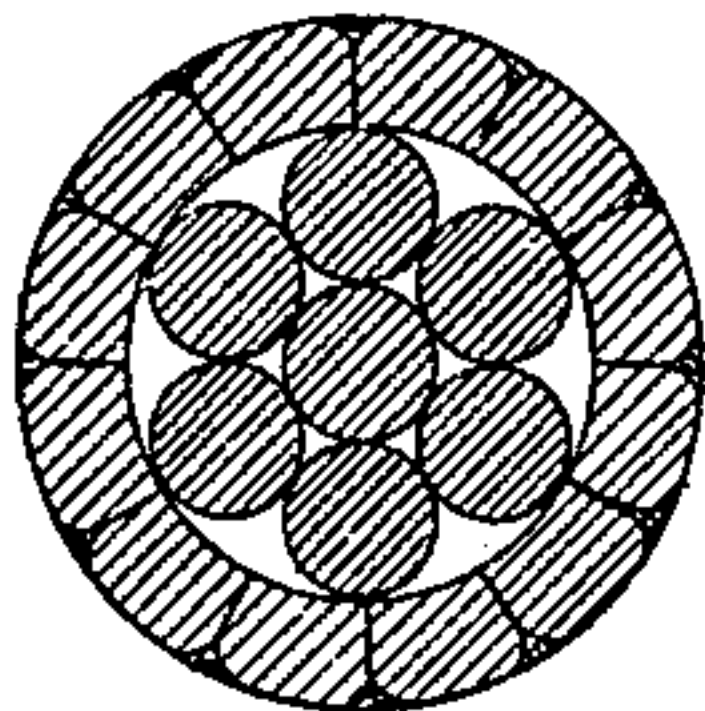


FIG. 6.

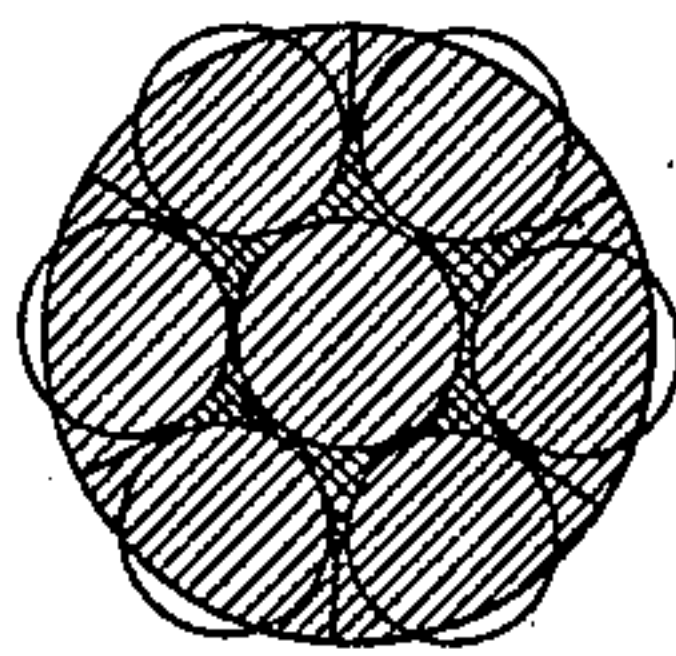


FIG. 7.

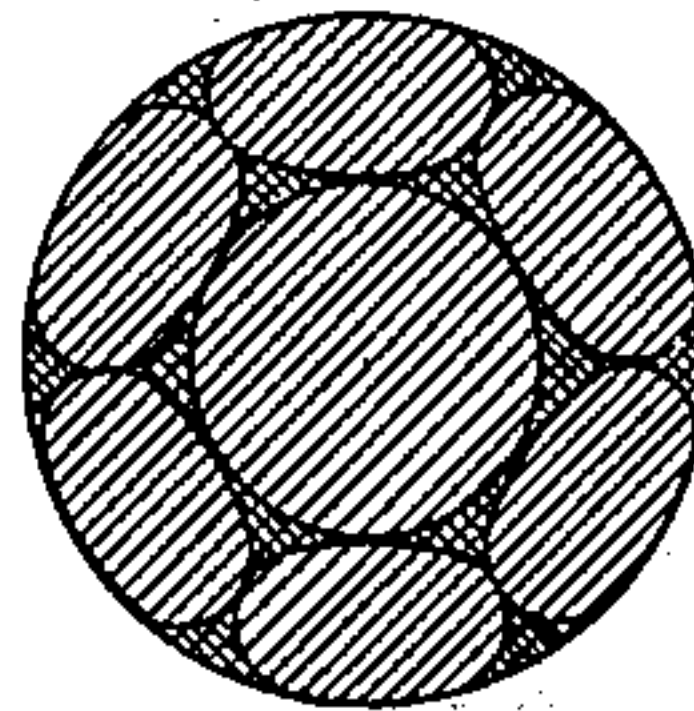


FIG. 8.

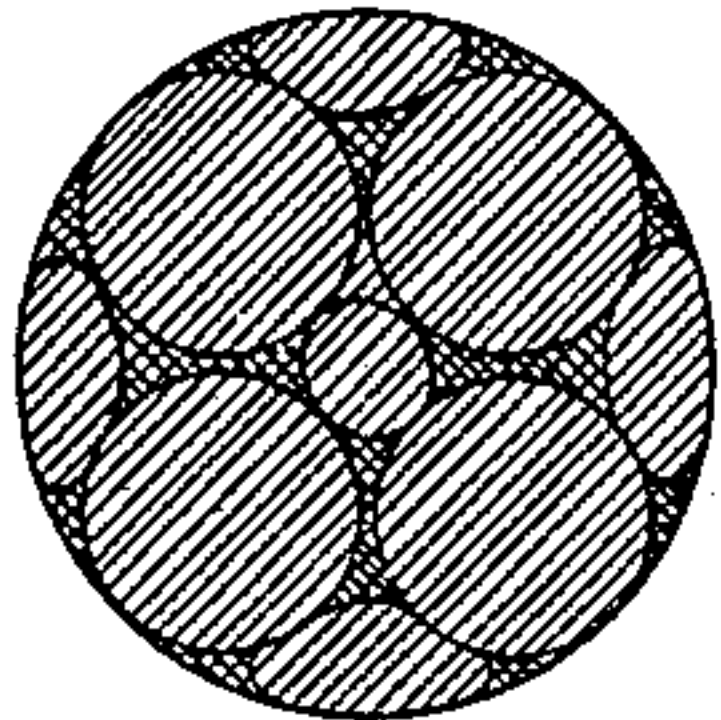


FIG. 9.

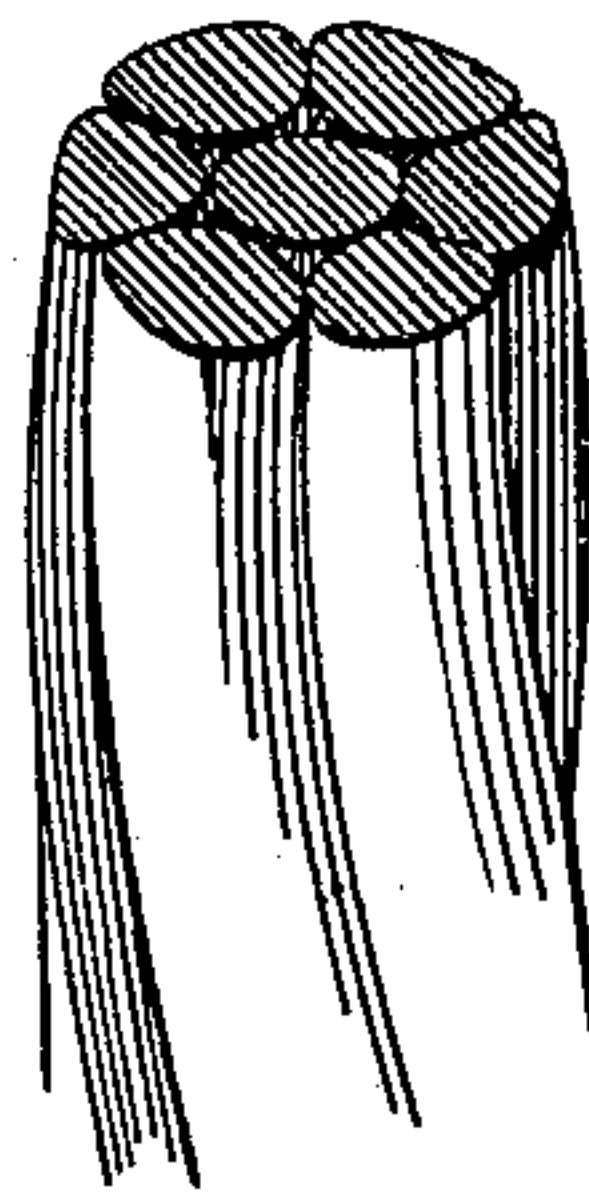
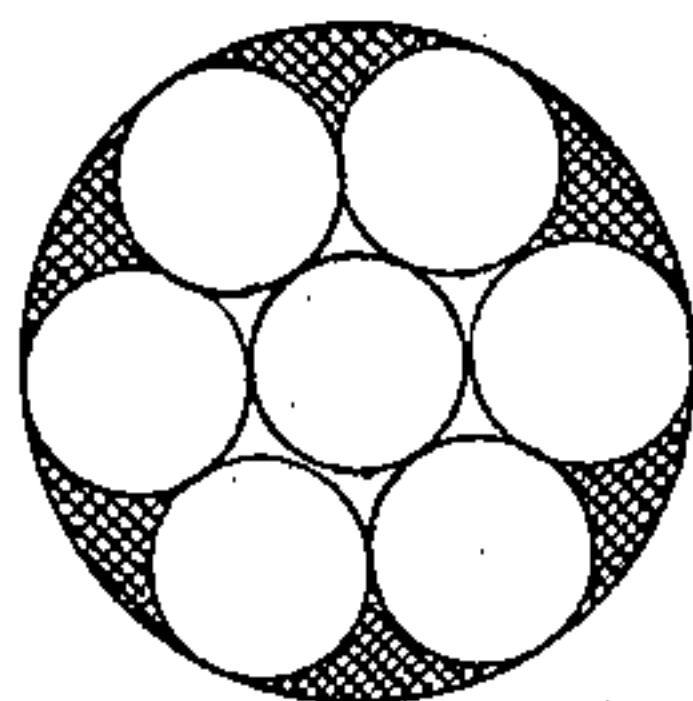


FIG. 10.



FIG. 11.



Witnesses
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UNITED STATES PATENT OFFICE.

ANDREW S. HALLIDIE, OF SAN FRANCISCO, CALIFORNIA.

WIRE ROPE AND CABLE.

SPECIFICATION forming part of Letters Patent No. 251,114, dated December 20, 1881.

Application filed September 27, 1880. (No model.)

To all whom it may concern:

Be it known that I, ANDREW S. HALLIDIE, of the city and county of San Francisco, State of California, have invented Improvements in the Manufacture of Wire Rope; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to wire ropes used in hoisting, transmitting power, haulage, and for similar purposes.

The ordinary method of making wire ropes is to twist or lay together cylindrical wires of the same metal into strands and to lay or twist these strands together to form a rope. Ropes made in this manner, when subjected to considerable friction or pressure, have the exterior wires composing them very much flattened and worn upon their outer surfaces, and on account of this wear the strands break and the rope becomes stranded.

I propose to lay the strands of the rope in such a manner that their exterior surface shall approximate in form the curve of the circumference of the rope, thus producing a more solid and compact rope, with a surface less susceptible to wear and presenting less irregularities to be acted upon.

The machine for flattening the wires is the subject of a separate pending application filed February 23, 1881.

I propose, further, to change the form of the cylindrical wire employed, so that those portions of the wires which are on the outside of the strand shall present a flattened surface, or a surface other than cylindrical or circular.

My invention consists in the following construction and arrangement, which will be hereinafter particularly described, and the points of novelty set forth in the claims.

In the accompanying drawings, Figures 1, 2, 3, and 4 show the different forms into which the wire may be drawn or formed to suit the particular strand or rope in which it is to be used. Fig. 5 shows a strand formed of seven round wires, with an exterior layer of wires flattened similarly to Fig. 1. Fig. 6 shows a strand formed of seven wires, the outer surface of the six inclosing-wires being flattened. Fig. 7 shows a seven-wire strand, in which the inclosing six wires are made oval in form, like Fig. 3, to produce the flattened surface. Fig. 8 shows

a five-wire strand having interstitial filling-wires shaped as shown in Fig. 4. Fig. 9 is a perspective view of the end of a seven-wire strand having the six inclosing-wires flattened in the form shown in Fig. 2. Fig. 10 is a transverse section of a single interstitial wire used in filling between strands or ropes formed of round wires, as shown in Fig. 11.

In order to accomplish my object I change the form of the wires into the shapes similar to Figs. 1, 2, 3, and 4 by suitable means, and twist the same, either during the process of manufacturing or afterward, and by giving them the same number of twists per foot as the lay or twists of the strands into which it is proposed to make these wires, so that when the wires are laid or twisted together and form a strand the flattened faces will always appear on the outside of the strand into which they are made; or I place the cylindrical wires in a suitably-constructed machine, so that while the wires are being twisted together into strands they are rolled or drawn into suitable form for the purpose intended, and in like manner present the flattened faces of the wires on the outside of the strands into which they are twisted or laid.

In some cases the strands of wire ropes are made of two layers of wires, one covering the other, in which case I lay or twist the two layers in the same direction; but it is not important or necessary that the inner layer of wires should have flattened faces; but in all cases the wires in process of laying into strands must always present the flattened surface on the outside, and at the same time each wire, in itself, must be kept straight or free from twist, although it is coiled or laid with the others into a strand.

It is obvious that if I should draw or roll a wire by pulling the wire between dies or rolls, so as to give it a face flattened on one side and parallel to the axis of the wire, in order to lay two or more of these wires into a strand, or so as to form a strand, I must twist each wire for every revolution of the twisting-machine in order to keep the flattened surface of the wire on the outside of the strand, and a wire rope made this way would naturally untwist and fly apart; but by shaping the wire spirally and making the pitch of the spiral the same as the

y of the strand, when I lay or twist the wires together into a strand the flattened surfaces of the wires will always appear on the outer side of the strand. When cylindrical wires are employed, as in ordinary wire ropes, there is a space between each wire unoccupied. In that space bounded by the curves of the adjoining cylindrical wires and a circular line bounding the wires which are laid or twisted into an ordinary strand I lay interstitial wires, made in the manner already described, with their flattened or convex faces on the outside.

I am aware that hollow cores have had angular metallic strips laid around the outside and parallel with the axis of the core, these strips being covered with felt and the whole wrapped with flat ribbons, so as to form spirals approaching a right angle with the central core, for protection, and I do not claim such a device, as it is in no sense a rope formed of strands and suitable for transmitting power; out,

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A wire rope comprising one or more se-

ries of wires, the outer wires of which are non-circular in cross-section and are laid spirally around an interior core or strand, the non-circular wires being spirally formed, with the same pitch or lay as the lay of the strand of which they form a part, substantially as herein set forth.

2. As a new article of manufacture, a wire rope or cable having its component wires non-circular in section and spirally formed, so that they will present the same face on the outside of the strand thereof, substantially as herein described.

3. A wire rope formed of twisted strands or wires having interstitial wires laid in the outer spaces between adjoining wires, said supplemental wires being formed in cross-section, so as to approximately fill the spaces and present a convex or flattened exterior surface, substantially as herein described. 45

In witness whereof I have hereunto set my hand.

ANDREW S. HALLIDIE.

Witnesses:

S. H. NOURSE,

FRANK A. BROOKS.