(No Model.) 3 Sheets—Sheet 1.

H. ROOT.

MACHINE FOR MAKING WIRE ROPE.

No. 405,744. Patented June 25, 1889.

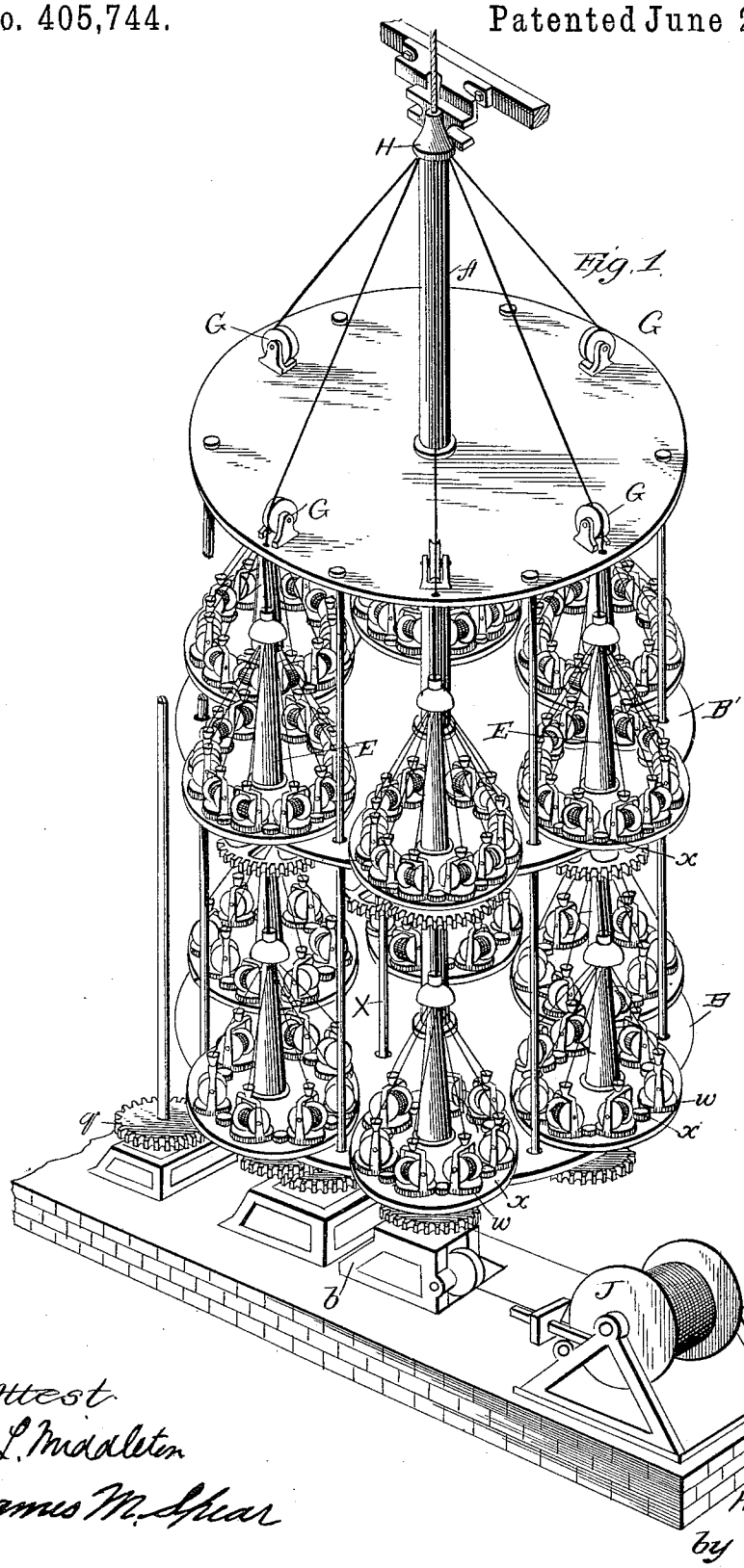


Fig. 1.

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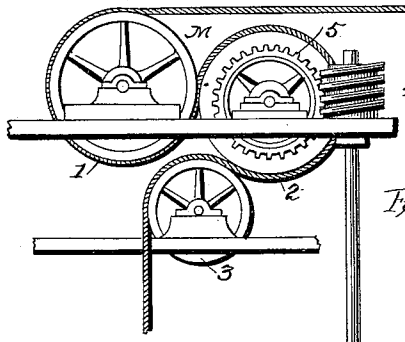


Fig. 2.

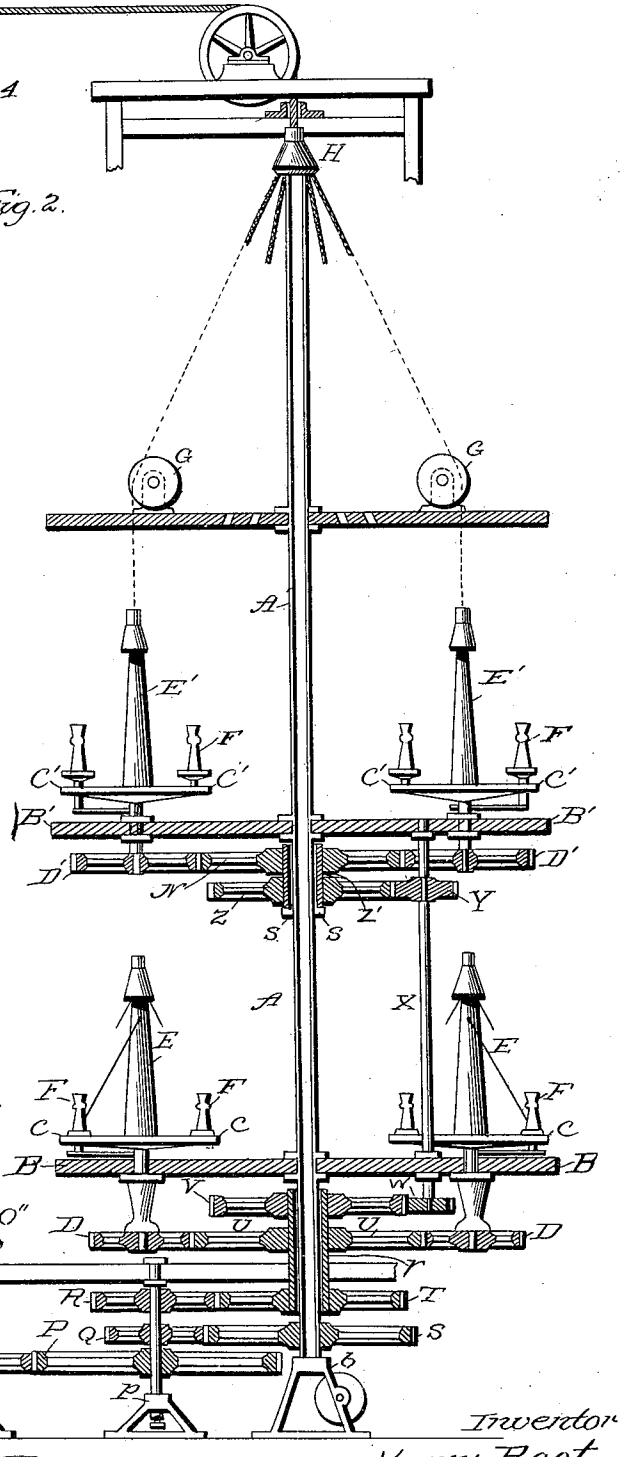


Fig. 3.

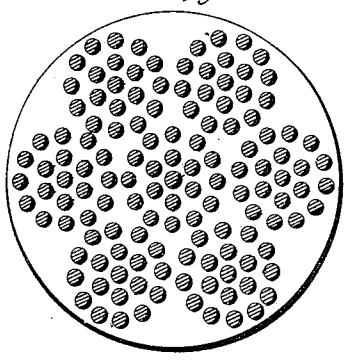
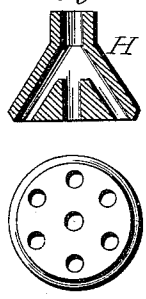


Fig. 2a



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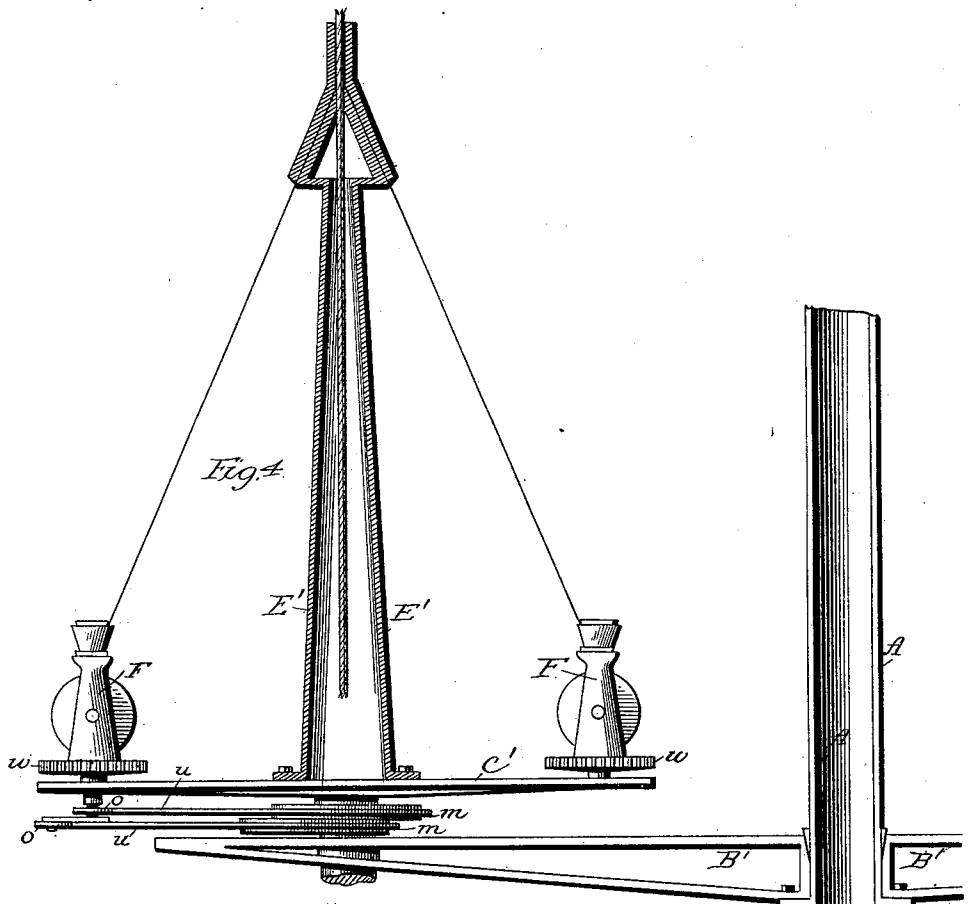
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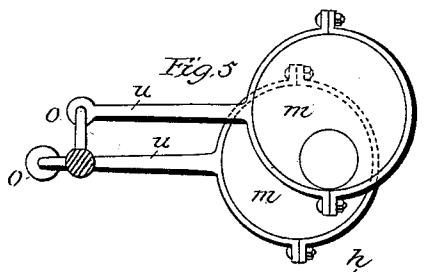
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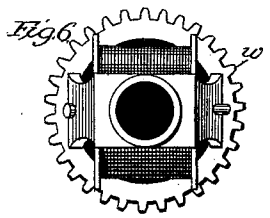
H. ROOT.

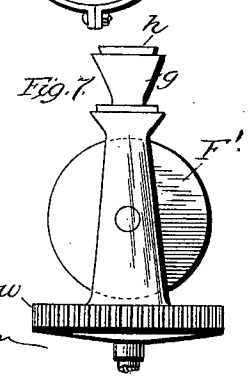
MACHINE FOR MAKING WIRE ROPE.

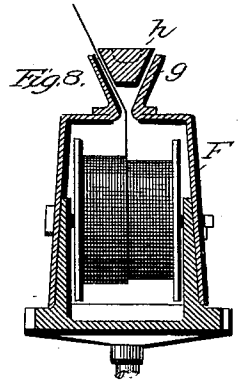
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UNITED STATES PATENT OFFICE.

HENRY ROOT, OF SAN FRANCISCO, CALIFORNIA.

MACHINE FOR MAKING WIRE ROPE.

SPECIFICATION forming part of Letters Patent No. 405,744, dated June 25, 1889.

Application filed May 6, 1881. Serial No. 32,589. (No model.)

To all whom it may concern:

Be it known that I, HENRY ROOT, of the city and county of San Francisco, State of California, have invented an Improvement in Machines for Making Wire Rope; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of wire-rope machines in which a continuous rope is made by a series of steps which involve, in a single machine, the laying up of the wires to form strand-cores, the laying up of the wires about said cores to form the strands, and finally the laying up of said strands about a central core to form the completed rope.

In a machine of this class, embodying a central rotary shaft with platforms having independent spool-carrying turn-tables, my invention consists in the novel power-transmitting mechanism for rotating the central shaft and imparting axially rotary motion to the turn-tables, as I shall hereinafter fully describe.

The object of my invention is to simplify the construction of the machine and at the same time render it stronger, more durable, and more effective and economical in operation.

In the accompanying drawings, to which reference is hereby made, Figure 1 is a perspective view of my machine. Fig. 2 is a vertical section through the central spindle and gears. Fig. 2^a is an enlarged section and a bottom view of the laying-head, showing the perforations. Fig. 3 is a transverse section of the rope or cable as formed. Fig. 4 is an enlarged section of the spindle and one turn-table and mechanism for revolving the spool-frame. Figs. 5, 6, 7, and 8 are detail views.

A is a central hollow vertical shaft supported in a step *b*, in which it rotates. About the shaft, at different heights, are the platforms B B′, two only being here shown, their number depending upon the size of the strands to be made.

C C′ are the turn-tables. These are carried by the platforms B B′, being mounted on shafts E. To each turn-table is imparted a rotary motion on its own center, in addition to the primary revolution which all have about the central shaft. There are as many turn-tables on each platform as there are strands to be made.

Upon each of the turn-tables are the spool and frame F, carrying the wire. The frames F are carried by shafts mounted in the turn-tables, and are given an axially rotary movement in order to keep the face of the wires always in the same direction to lay them up straight.

The parts described above and their several movements are those common and essential to this class of machines, and it will readily be seen that by the rotation of the turn-tables on the lower platform about their own axes the wires are laid up to form strand-cores. By the rotation of the turn-tables on the upper platform these cores have a series of wires laid up around them to form strands. By the revolution of all the turn-tables about the central shaft the strands are laid up to form the rope, and by the rotation of the spool-frames on their own axes the wires are laid up straight in the strands. The mechanism by which these movements are imparted is as follows: The upright shaft O′, carrying a miter-gear O″, and the gear marked O are here the initial devices. Gear O meshes with a large gear P on a short shaft *p*, which is for the purpose of reducing the velocity. Upon the short shaft *p* are the gears Q and R. The gear Q meshes with a gear S, which is fast on the central shaft A, whereby said shaft and with it the whole machine is rotated. The gear R meshes with a gear T, which latter gear is on a sleeve *r* about the central shaft A. Upon sleeve *r* is a large gear U, around which and meshing therewith are the gears D, one of which is fixed on the shaft E of each turn-table C upon the lower platform B. Thus a rotary axial motion is imparted to each of the turn-tables on said platform. Upon the same sleeve *r*, above the large gear U, is a gear V, which meshes with a gear W, located to one side of the central shaft or axis of the machine. This gear W is upon the bottom of a jack-shaft X, which extends upwardly toward the upper platform B′ and has upon its top another gear Y, which meshes with a gear Z upon a sleeve *s*, which is loose upon the central main shaft A. Upon this sleeve *s* is the large gear N, around which and meshing therewith are the gears D′, attached to and operating the shafts E′ of the turn-tables of the upper

platform. Thus the power is carried up from the center by sleeve *r* to the jack-shaft X at one side and back again to the center to sleeve *s*, and thence to the turn-tables of the upper platform, whereby each receives an axially-rotary motion. The motion of each spool-frame upon its own axis is acquired through two eccentrics *m m* for each turn-table loosely fitted upon the central shaft or axle of the said turn-table at right angles, the lower eccentric being firmly secured to the platform and the upper eccentric being secured to the lower, so that the shafts of the turn-tables rotate within the eccentrics which accompany the platforms about the main central shaft A. The vertical shaft of one spool-frame F on each turn-table extends downwardly, and is provided with a double crank *o o*, attached by crank-rods and straps *u* to the eccentrics. It is obvious that at each revolution of the entire machine the spool-frame thus acted upon will be rotated axially. In order to act upon the other spool-frames, a gear *w* is placed upon the actuating-spool, and upon the other spools are placed similar gears. Between these are gears *x*, establishing the complete chain.

The top *g* of each of the spool-frames F is made cup-shaped. Into these cups are dropped the cones *h*, fitting loosely therein. The wire is carried up through the cup between its side and the cone. The weight of the cone will keep the wire taut, and it can travel around the surface of the cone as the machine rotates.

Upon each turn-table of the lower platform is the usual extra spool with a wire leading into the hollow shaft E near its top, Fig. 2, as a central wire, and six other spools upon each table, the wires of which, by the rotation of the turn-table, lie up about said central wire to form the strand-cores for the wires of the upper turn-tables, which, laid up on said cores, form strands. These strands pass up over the pulleys G to the perforated block or laying-head H on top of the central shaft A.

J, in Fig. 1, is a spool or reel having wound upon it a hempen cord or rope, which passes up through the hollow central shaft A and forms a core for the rope, the strands of said rope being laid up on the hempen core by the axial rotation of the entire machine.

M designates suitable mechanism for drawing off the completed rope. This consists of two main driving-sheaves 1 2, about which the completed rope passes in the course of a letter **S**, and a smaller guide-sheave 3 below, by which the rope is directed to the winding-drum. (Not here shown.) Power is transmitted to the main driving-sheave 2 by means of a worm 4, which meshes with a gear 5 on the shaft of said sheave, said worm being on the upper end of the upright shaft O′, which carries the gear O, heretofore mentioned, and also a miter-gear O″, by which, through another miter-gear O^9, the whole machine receives its initial power.

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

1. In a machine for making wire rope, the combination of a central rotary shaft, a platform carried thereby, independent spool-carrying turn-tables on the platform, the shaft *p*, having gears Q and R, a gear on the central shaft meshing with gear Q, a sleeve on said central shaft having a gear T, meshing with the gear R, said sleeve having also a gear U, and gears on the axes of the turn-tables arranged about and meshing with the gear U on the sleeve, substantially as herein described.

2. In a machine for making wire rope, the combination of a central rotary shaft, a lower platform and an upper platform carried by said shaft, independent spool-carrying turn-tables on each of said platforms, a jack-shaft located to one side of the center shaft of the machine, an independently-revoluble sleeve mounted on the central shaft, gears connecting said sleeve with the lower end of the jack-shaft, whereby it is rotated, gears connecting said sleeve with the turn-tables of the lower platform, whereby they are axially rotated, an independently-revoluble sleeve on the central shaft above, and gears connecting said sleeve with the upper end of the jack-shaft and with the turn-tables of the upper platform, whereby they are axially rotated, substantially as described.

3. In a machine for making wire rope, the combination of the central rotary shaft, the lower platform and the upper platform carried thereby, independent spool-carrying turn-tables on each platform, the rotary sleeve *r* on the central shaft, a transmitting-gear U on said sleeve, and gears on the axes of the turn-tables of the lower platform arranged about and meshing with the transmitting-gear U of the sleeve, a second transmitting-gear V on said sleeve, a second sleeve *s*, mounted on the central shaft above and having a receiving-gear Z and a transmitting-gear N, a jack-shaft to one side of the center of the machine, said jack-shaft having a gear meshing with the second transmitting-gear V of the lower sleeve and a gear meshing with the receiving-gear Z of the upper sleeve, and gears on the axes of the turn-tables on the upper platform arranged about and meshing with the transmitting-gear N on the upper sleeve, substantially as herein described.

4. In a machine for making wire rope, the combination of the central rotary shaft, a lower platform and an upper platform carried thereby, independent spool-carrying turn-tables on each platform, a shaft *p*, having gears Q and R, a gear on the central shaft meshing with the gear Q, a sleeve *r* on the central shaft having the gear T meshing with the gear R, said sleeve having also a lower transmitting-gear U and an upper transmitting-gear V, gears on the axes of the turn-tables of the

lower platform arranged about and meshing with the lower transmitting-gear U of said sleeve, a second sleeve *s* on the central shaft above and having a receiving-gear Z and a transmitting-gear N, a jack-shaft to one side of the center of the machine, said jack-shaft having a gear meshing with the upper transmitting-gear V of the lower sleeve and a gear meshing with the receiving-gear Z of the upper sleeve, and gears on the axes of the turn-tables on the upper platform arranged about and meshing with the transmitting-gear N of the upper sleeve, substantially as herein described.

5. The means for laying up series of wires around central cores, then laying other series of wires around the strand-cores thus formed, and finally laying the completed strands around a main core to form a rope consisting of the core-reel J, turn-tables C C′, supporting-platforms B B′, and a hollow main shaft provided with a perforated cone-shaped head H, in combination with the gear-wheels secured to said turn-tables, sleeves surrounding the main shaft, and gears carried by said sleeves, an auxiliary shaft mounted in the supporting-platforms and provided with gears meshing with the gears upon the sleeves, and means for operating the main shaft and the lowermost sleeve, substantially as herein described.

6. The turn-tables or frames C C′ and the shaft A, and means for supporting said turn-tables and operating the same and the shaft, in combination with the spool-frames F, having cup-shaped tops and provided with cones fitting therein, substantially as herein described.

In witness whereof I have hereunto set my hand.

HENRY ROOT.

Witnesses:
S. H. NOURSE,
FRANK A. BROOKS.