No. 703,778.

Patented July 1, 1902.

# E. P. FREDERICK.

## WIRE ROPE MACHINE.

(Application filed Feb. 27, 1900.)

(No Model.)

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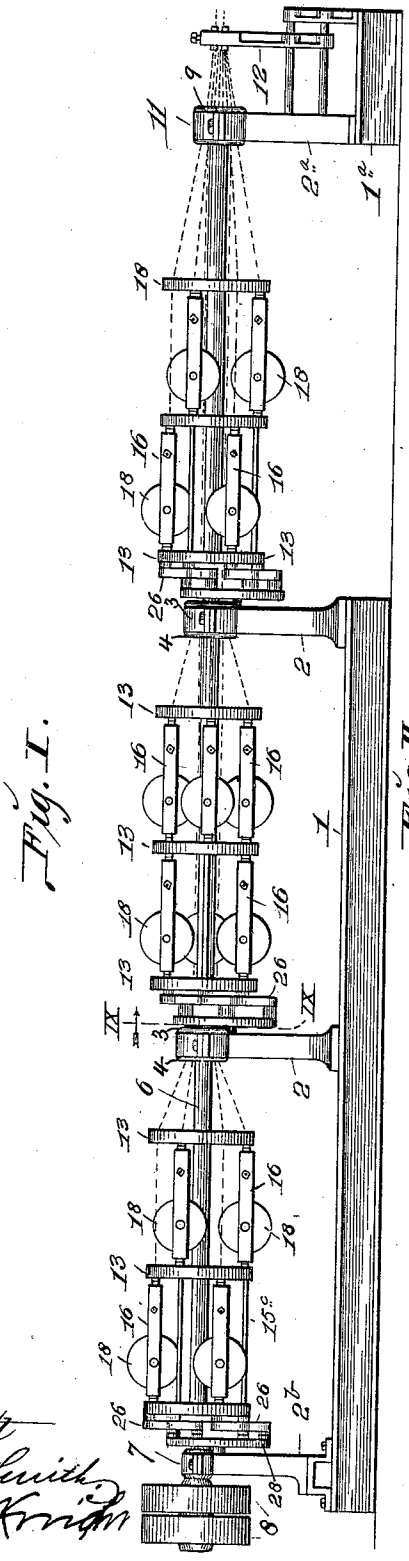


Fig. I.

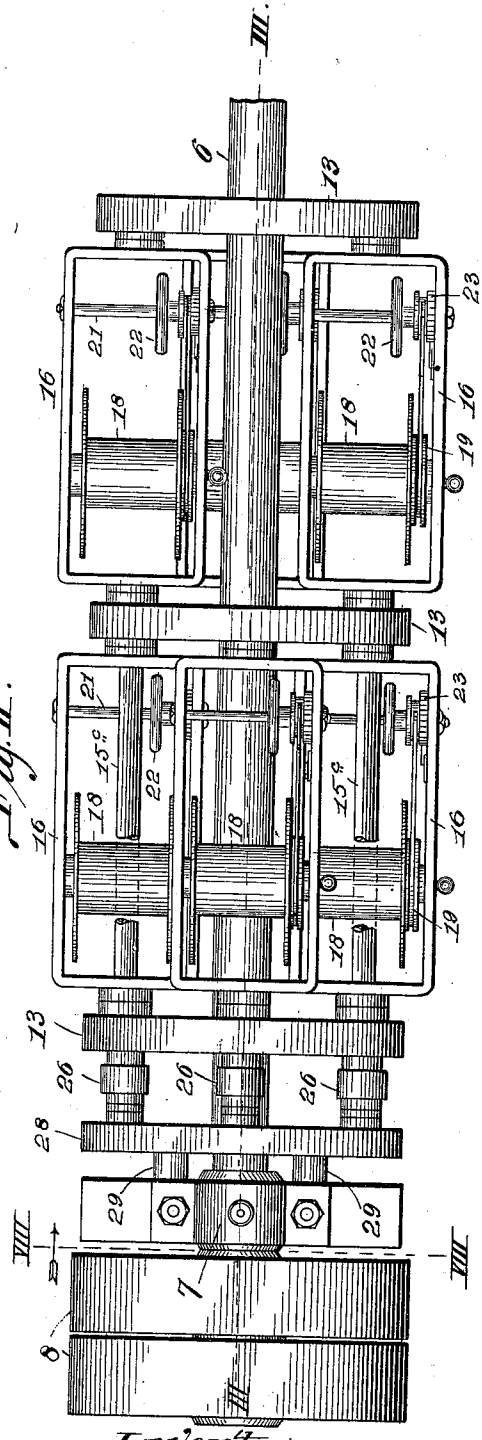


Fig. II.

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(No Model.) 3 Sheets—Sheet 2.

Fig. III.

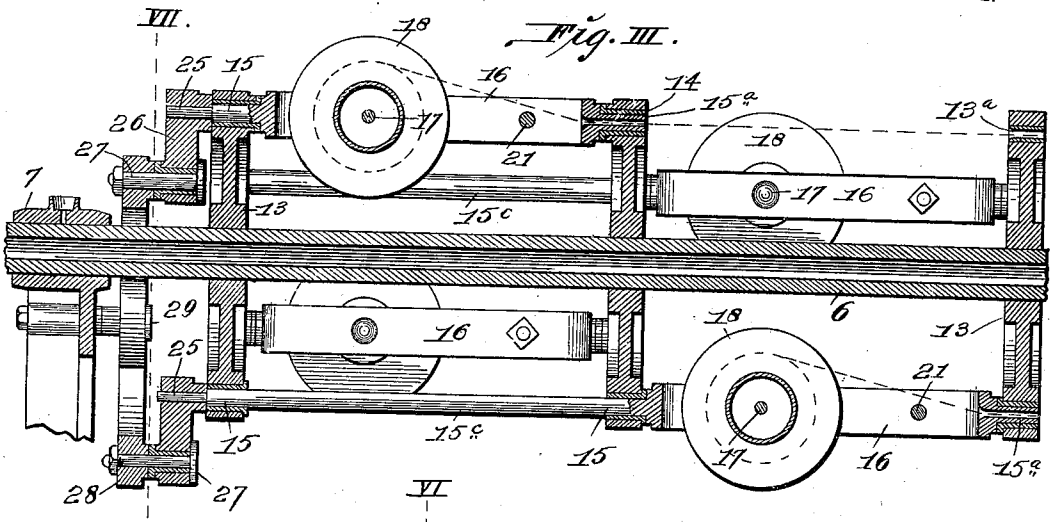



Fig. IV.

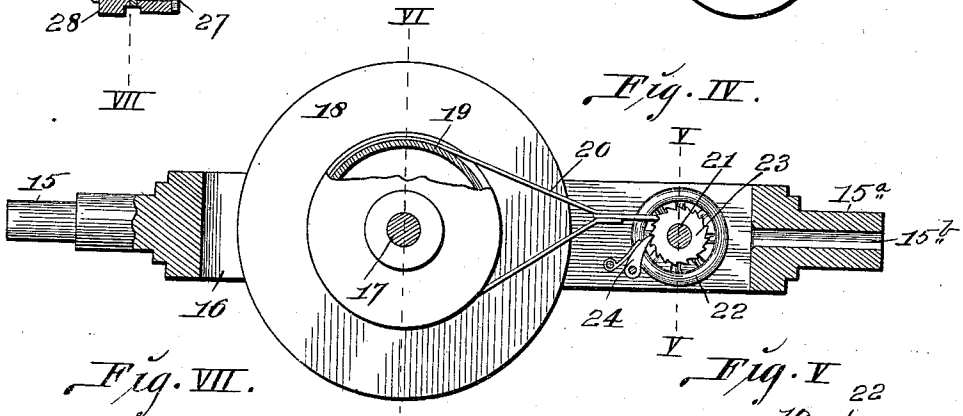



Fig. VII.

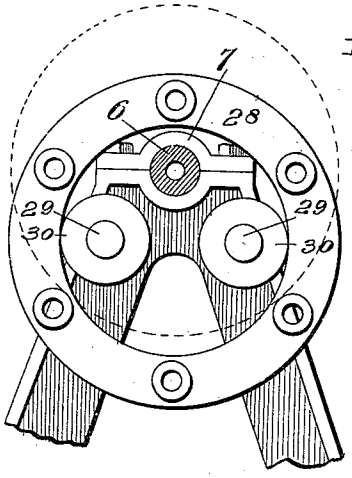



Fig. V

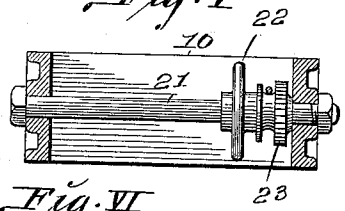
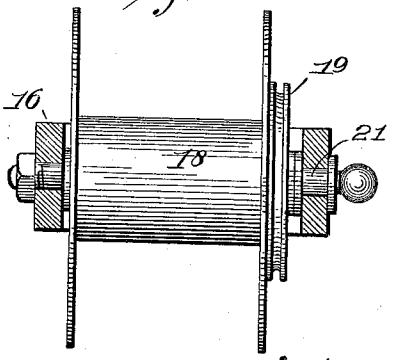



Fig. VI




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WIRE ROPE MACHINE.

(Application filed Feb. 27, 1900.)

(No Model.)

3 Sheets—Sheet 3.

Fig. VIII.

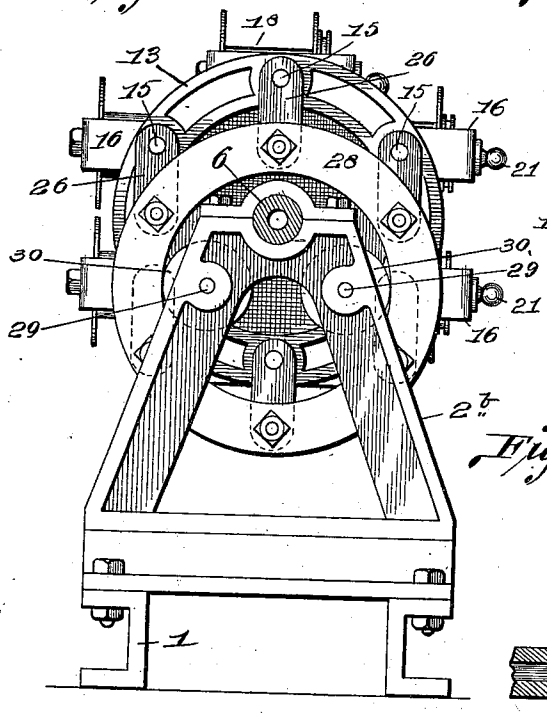



Fig. IX.

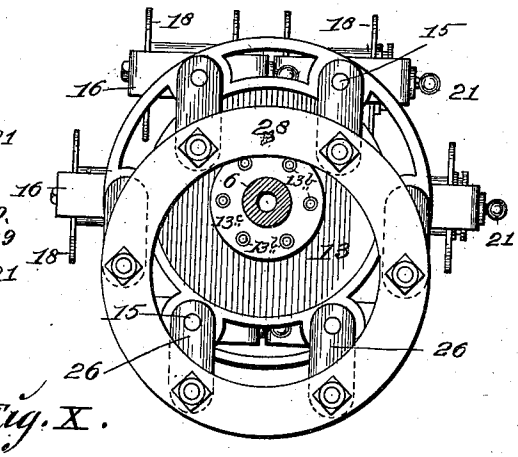



Fig. X.

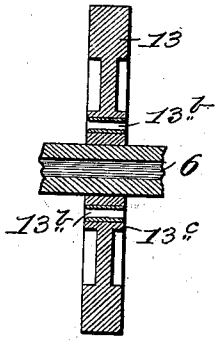



Fig. XI.

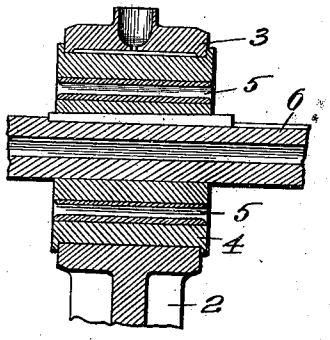



Fig. XII.

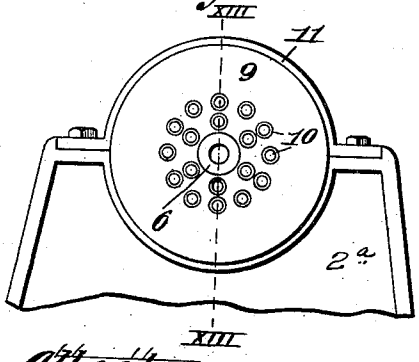
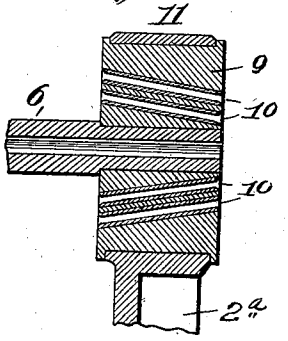



Fig. XIII.




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# UNITED STATES PATENT OFFICE.

EDWARD P. FREDERICK, OF ST. LOUIS, MISSOURI.

## WIRE-ROPE MACHINE.

SPECIFICATION forming part of Letters Patent No. 703,778, dated July 1, 1902.

Application filed February 27, 1900. Serial No. 6,770. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD P. FREDERICK, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Wire-Rope Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a wire-rope machine particularly well adapted for use in making eighteen-strand wire ropes or cables, the object of my invention being to so construct such a machine as to avoid the use of large spool-carriers and to avoid vibration of the carriers due to their heavy weight and high speed. To this end I arrange the spool-carriers in tandem form upon a single shaft and employ supporting-standards for the shaft, two of which are arranged at each end of the shaft and one between each pair of spool-carriers. Strung upon the shaft and supported by the standards are apertured bushings, through which the wires from the rear spool-carriers pass to the forward end of the machine.

My invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, illustrating my invention, Figure I is a view in side elevation of my improved machine. Fig. II is a top or plan view of the left-hand end of the machine as seen in Fig. I. Fig. III is a vertical sectional view taken on the line III III, Fig. II. Fig. IV is an enlarged detail view of one of the wire-spools and its carrying-frame, the frame being shown partly in longitudinal section. Fig. V is a cross-sectional view taken on the line V V, Fig. IV, through the spool-carrying frame. Fig. VI is a cross-sectional view taken on the line VI VI, Fig. IV. Fig. VII is a detail elevation of one of the governor-rings, the main shaft of the machine being shown in cross-section, taken on the line VII VII, Fig. III. Fig. VIII is an end view of the machine, the main shaft being shown in section, taken on the line VIII VIII, Fig. II. Fig. IX is an end view of the intermediate section of the machine, the main shaft being shown in cross-section, taken on the line IX IX, Fig. I. Fig. X is a cross-sectional view of one of the spool-frame-carrying rings. Fig. XI is a detail longitudinal sectional view of a fragment of the main shaft, one of the standards, and one of the apertured journal-bearings, through which the wires pass in conveying them through the machine. Fig. XII is a detail elevation of the discharge-wire-receiving head. Fig. XIII is a cross-sectional view taken on the line XIII XIII, Fig. XII.

1 $1^a$ designate the base of the machine on which are mounted stationary standards 2, $2^a$, and $2^b$. The standards 2 have journal-boxes 3 at their upper ends, and located in each journal-box is a journal-bearing 4, provided with bushed apertures 5. (See Fig. XI.)

6 designates the main shaft of the machine, which extends throughout the machine's length and to which are keyed the journal-bearings 4, as seen in Fig. XI. The shaft 6 is also mounted in a journal-box 7 on the standard $2^b$ and is provided with driving-pulleys 8. The opposite end of the shaft from that to which the pulleys are applied is mounted in a journal-bearing 9, rotatably mounted in the journal-box 11 of the standard $2^a$. The journal-bearing 9 is provided with a series of bushed apertures 10, extending therethrough, the number of said apertures corresponding to the number of wires delivered from the spools throughout the machine, the wires passing directly from said journal-bearing 9 to a suitable strand-former 12, located in proximity to the standard $2^a$.

Mounted on the main shaft 6, between the standards in which said shaft is supported, are the separate series of rings, spool-carrying frames arranged therein, and spools from which the wire is delivered. In each series containing the wire-holding spools are three rings 13, fixed to the main shaft 6, so as to turn therewith. At the rim of each ring are journal-apertures 14, that receive the journals 15 $15^a$ of the spool-carrying frames 16. The frames 16 are rectangular in form and receive the shafts 17 of the wire-holding spools 18, said spools being adapted to turn freely on their shafts. The shafts 17 are removable to permit of their withdrawal for the purpose of permitting the removal of the spools from the frames to fill them with wire. Each spool 18 is equipped with a grooved ring 19, that

receives the brake-strap 20, connected to an adjustment-shaft 21, journaled in the frame 16. The adjustment-shaft is provided with a hand-wheel 22, whereby it may be turned to tighten the brake-strap to increase the tension thereof on the spool-carried rings 19. On the adjustment-shaft is a ratchet-wheel 23, that receives the engagement of a spring-controlled pawl 24, by which the shaft is held in a set position and any desirable adjustment of the brake-strap is maintained. The journals $15^a$ of the spool-carrying frames 16 are provided with longitudinal apertures $15^b$, through which the wires pass from the spools 18 (see Fig. III) in a direction toward the discharge end of the machine. In each series of the rings, frames, and spools carried thereby there are two sets of the frames and spools, the first set being located between the first and second ring and the second set being located between the second and third ring. The journals 15 of the second set of frames in each instance extend through the second or intermediate ring 13 and are continued as shafts $15^c$ to the first-ring 13 or that nearest the driving end of the main shaft 6, so that the journals of all of the spool-carrying frames are extended to and operate in the first ring 13 of each series. The journals 15 are provided with spindles 25, to which cranks 26 are fixed. The cranks 26 are connected by swivel-bolts 27 to governor-rings 28. (See Figs. III, VIII, and IX.) Mounted in each of the standards 2 and $2^b$, beneath the main shaft 6, are stud-bolts 29, on which are mounted rollers 30, that bear against the inner edges of the governor-rings 28. (See Figs. VII and VIII.) The stud-bolts 29 and rollers 30 being located beneath the plane of the shaft 6, it will be seen that the governor-rings arranged in engagement therewith are placed out of center with relation to the axis of the rings 13.

In the practical use of the machine the rings 13, fixed to the shaft 6, revolve with said shaft and carry the spool-holding frames 16, journaled therein. The governor-ring 28, loosely inclosing the rollers 30 and mounted out of line with the rings 13, is hung upon the cranks 26 by the swivel-bolts 27, and as the rings 13 revolve the cranks 26 force the governor-ring into pressure against first one and then the other of the rollers 30, in which action the cranks are caused to turn in reverse direction from that of the shaft 6, thereby causing the spool-holding frames 16 to be revolved in a reverse direction from that in which the shaft turns, whereby the wire-carrying spools 18 are constantly carried in reverse direction to that in which the rope strand is being twisted and the natural twist in the wire is removed therefrom and the wire prevented from overtwisting throughout the extent of the machine. The spool-holding frames are thus maintained in a horizontal position all the time. From the apertured journals $15^a$ of each spool-carrying frame of the first set in each series the wires pass through apertures $13^a$ (see Fig. III) in the third ring of the series, and from the first and second series of the machine the wires pass from the third ring into the bushed apertures 5 of the journal-bearings 4, and therethrough into and through bushed apertures $13^b$ of the hubs $13^c$ of the rings 13 in the two series nearest the discharge end of the machine. By this arrangement all the wires are conveyed throughout the machine in close proximity to the shaft thereof. From the series nearest the discharge end of the machine the wires all pass into the discharge journal-bearing 9 through the bushed apertures thereof to the strand-former 12, where the rope is produced.

I claim as my invention—

1. The combination, in a wire-rope machine, of a continuous shaft, standards by which the shaft is supported, bushings interposed between the shaft and the standards, and spool-carriers mounted on said shaft, one in front of the other, and separated by said standards; each of said bushings being secured to the shaft so as to revolve therewith and having journal-bearing in its standard to prevent vertical and lateral vibrations of the shaft when the machine is in motion, and said bushings having apertures through which the wires from the rear carriers pass, substantially as shown and described.

2. The combination, in a wire-rope machine, of a continuous shaft, standards by which the shaft is supported, bushings interposed between the shaft and the standards, and three spool-carriers mounted on said shaft one in front of another, two of said standards being located between said carriers and one at each end of the shaft, and said bushings being secured to the shaft and having journal-bearing in the standards to prevent vertical and lateral vibration of the shaft when the machine is in motion, the bushings that are located between the spool-carriers having apertures, for the passage of the wires from the rear carriers, substantially as set forth.

3. In a wire-rope machine, the combination of a continuous shaft, a series of spool-carriers, fixed to the shaft, bushings keyed to the shaft between each spool-carrier and provided with a series of apertures, and standards on which the bushings are journaled.

4. In a wire-rope machine, the combination of a continuous shaft, a series of spool-carriers fixed to the shaft, and comprising a series of rings, each ring having a series of apertures, and a plurality of spool-frames journaled in the rings, bushings keyed to the shaft between each spool-carrier, and provided with a series of apertures, and standards on which the bushings are journaled.

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In presence of—
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N. V. ALEXANDER.