H. D. ROBINSON.

CABLE WRAPPING MACHINE.

APPLICATION FILED MAY 25, 1909.

985,763.

Patented Feb. 28, 1911.

3 SHEETS—SHEET 1.

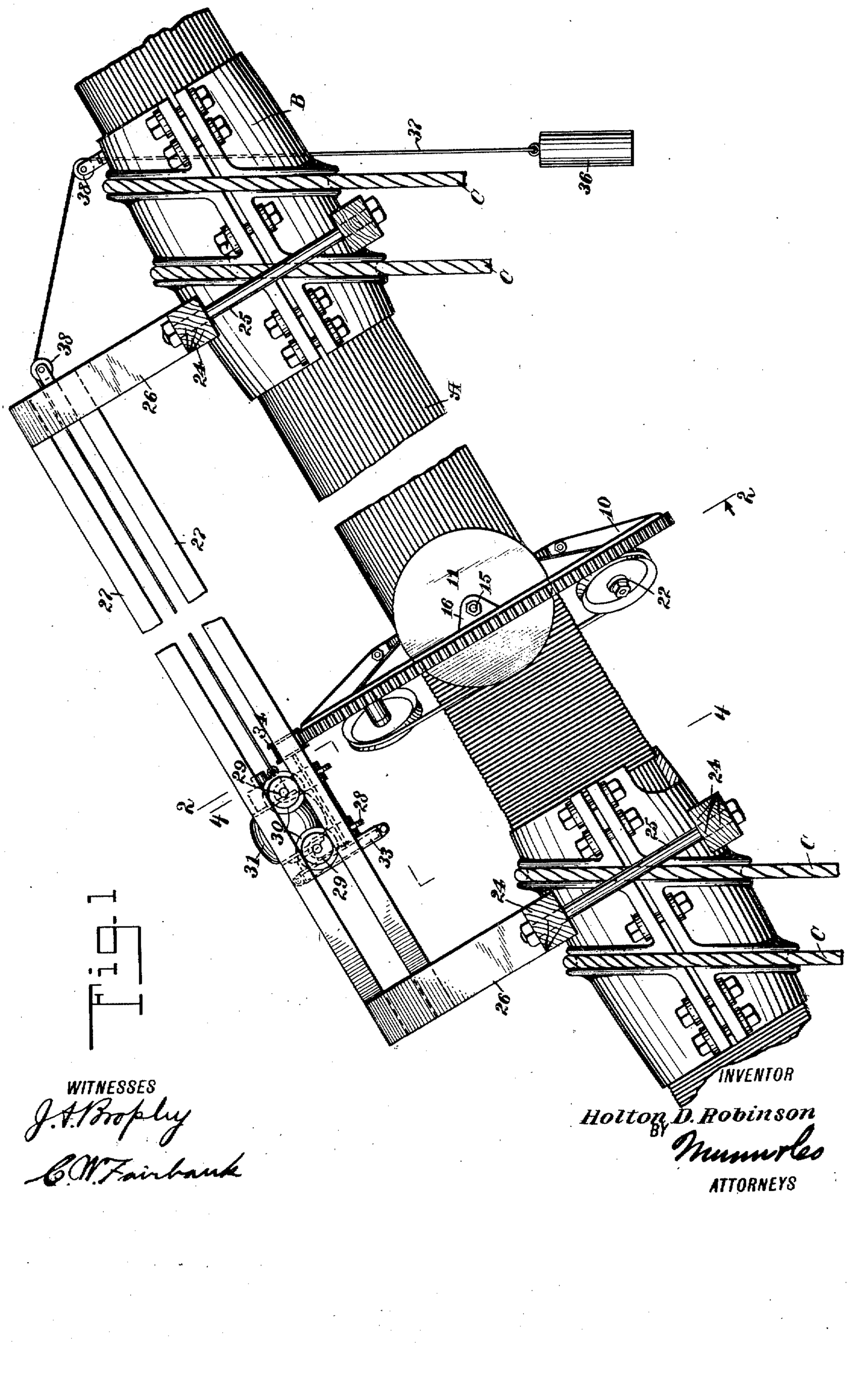

Fig. 1.

WITNESSES

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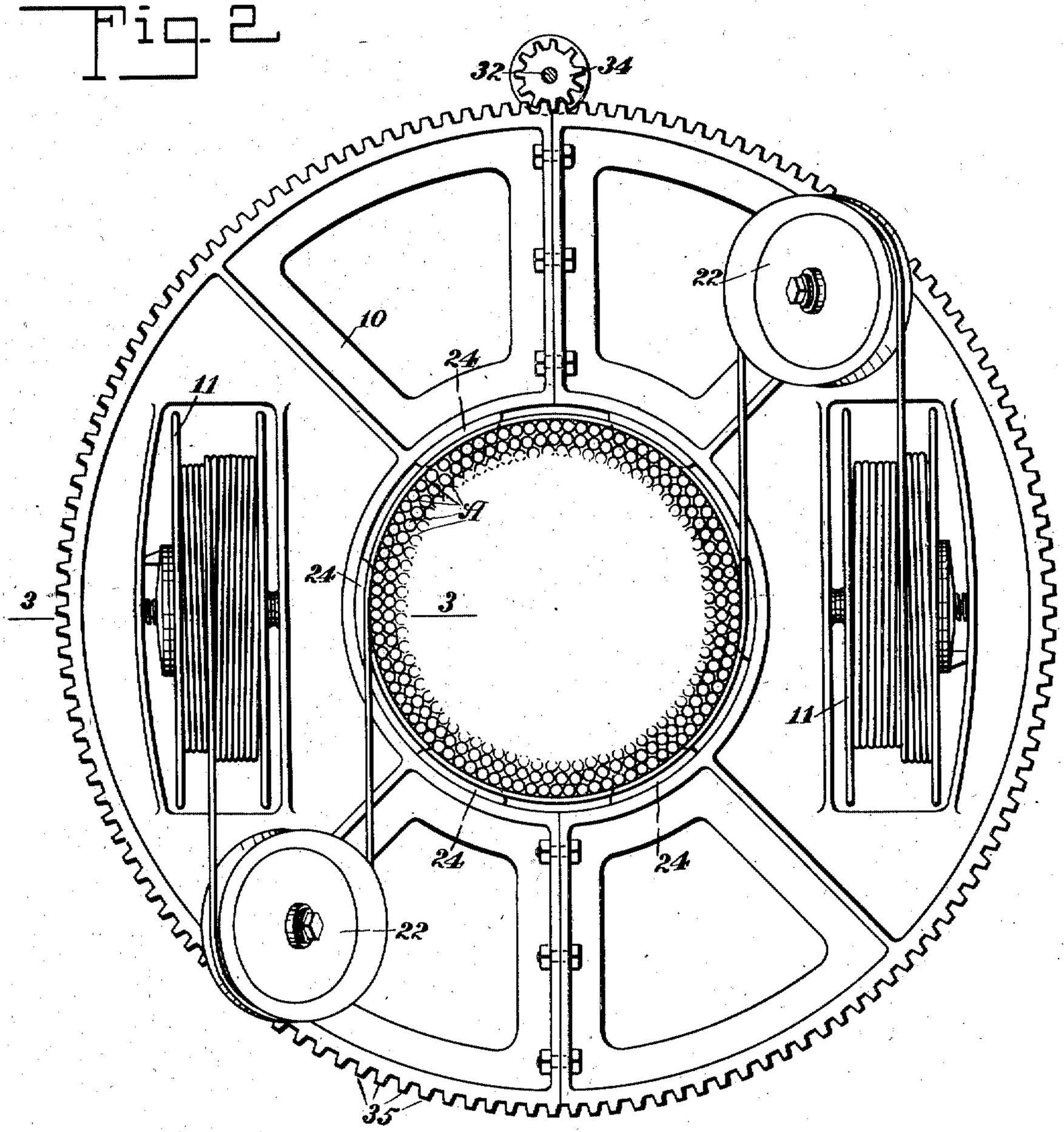
3 SHEETS—SHEET 2.

Fig. 2



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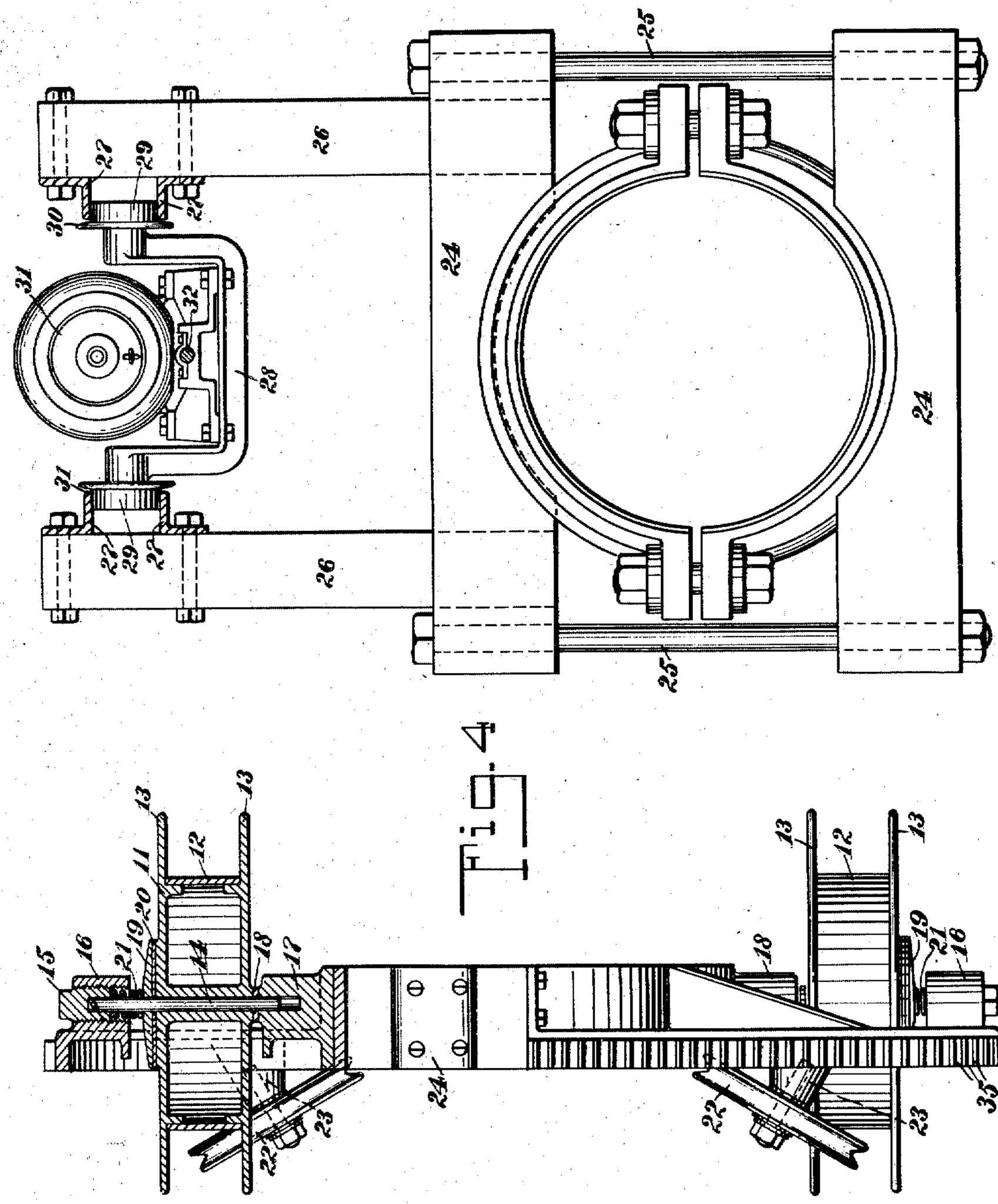

Fig. 4.

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HOLTON D. ROBINSON, OF NEW YORK, N. Y.

CABLE-WRAPPING MACHINE.

985,763. Specification of Letters Patent. **Patented Feb. 28, 1911.**

Application filed May 25, 1909. Serial No. 498,348.

To all whom it may concern:

Be it known that I, HOLTON D. ROBINSON, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Cable-Wrapping Machine, of which the following is a full, clear, and exact description.

This invention relates to the manufacture of cables, particularly those cables used for supporting suspension bridges, and in which there are a large number of separate strands held together and protected by one or more wires or strands wrapped around the main strands, to form an outer covering or casing.

My invention involves a machine or mechanism adapted to be temporarily secured to the unfinished cable for wrapping or winding the outer strands around the cable.

A machine constructed in accordance with my invention and involving most of the novel features, includes a member encircling the cable and movable longitudinally thereof and carrying a reel from which the wire is delivered to the cable as said member is rotated. Means are provided for rotating this member, and said means is so constructed as to travel lengthwise of the cable with the reel-carrying member.

Various features of my invention may be utilized independently of other features, or all of them may be combined in one device. I desire the drawings to be considered merely as illustrative and not in a limiting sense, as various changes may be made in the construction of the machine and within the scope of the appended claims without departing from the spirit of my invention.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, and in which—

Figure 1 is a side elevation of a machine constructed in accordance with my invention and secured to an inclined portion of a cable; Fig. 2 is a transverse section on the line 2—2 of Fig. 1, only a few of the strands of the cable being shown, and these upon an enlarged scale; Fig. 3 is an edge view of the reel-carrying member, a portion thereof being shown in section on the line 3—3 of Fig. 2; and Fig. 4 is a transverse section on the line 4—4 of Fig. 1.

The large cables employed for supporting suspension bridges are ordinarily formed of a large number of parallel strands A of wire, strung independently and afterward bound together at intervals along their lengths by saddles B, from which depend the suspending cables C leading to the roadway. Intermediate these saddles it is customary to provide an outer covering or jacket around the strands, which will hold them tightly together and which will prevent the admission of moisture to the spaces between the strands and the interior of the cable. This jacket or covering is commonly formed of or includes one or more strands of wire wound around the cable, the separate portions of the wire being closely adjacent each other and the wire being drawn taut.

My improved machine is designed for wrapping this outer jacket or wire in place, and operates automatically and continuously after once being secured in position.

In the specific form illustrated I employ an annular member 10, adapted to encircle the cable and rotate about the cable as an axis. This annular member carries the wire to be wrapped about the cable, and operates to secure the wrapping action as it rotates. The member is mechanically rotated at a uniform speed, and as it rotates it slowly advances along the cable, so that the separate turns of the wire will lie closely adjacent each other. The wire-carrying member is provided with two wire-carrying reels 11, mounted at diametrically opposite points and with their axes substantially in alinement with each other and along a diameter of the member. Each reel includes a drum portion and two outwardly-extending annular flanges 13 for preventing the wire from slipping off the ends of the reel or spool. Each reel extends through an opening in the member and is journaled so that it may rotate but the free rotation is retarded. Each reel is mounted upon a spindle 14, which is removable to facilitate the replacing of an empty reel by a full one. Each spindle at one end is provided with an enlarged head or plug 15, threaded into a boss or socket 16, and at its opposite end it fits within a socket

or opening in a boss 17. The reel is disposed between these two sockets and intermediate the base of the reel and the boss 17, is a friction washer 18, and between the opposite side of the reel and the boss 16, is a plate 19, a friction washer 20, and a coil spring 21 for engaging between the head 15 and the plate 19, to force the washer 20 into engagement with the end of the reel. The spring fits into a socket in the boss 16 and abuts against the head 15, so that by rotating the head 15, the tension of the spring may be increased or decreased as desired. A longitudinal movement of the head is accompanied by a longitudinal movement of the spindle, but as the spindle fits into a socket in the boss 17 and normally does not contact with the bottom of the socket, it is evident that a limited longitudinal movement of the spindle does not affect the supporting of the reel.

When it is desired to remove the reel, the head 15 is unscrewed and removed and as the spindle is secured to the head, the reel will now be free to move out of the opening in the member 10. The head 15 thus serves two purposes of holding the spindle in place and varying the tension of the spring 21. It is desired that the wire be wrapped about the cable under comparatively high tension, and this tension is secured by resisting the free rotation of the reels by increasing the tension of the springs 21.

In addition to the two reels 11, 11, the annular member 10 carries two pulleys 22, 22, over which the wire passes after leaving the reel and before reaching the periphery of the cable. Each pulley is mounted upon a spindle extending outwardly from a boss 23, and rotates in a plane at an angle to the plane of the member 10, and also at an angle to the plane of the corresponding reel. Each pulley is so disposed that one edge lies closely adjacent the surface of the member 10, to deliver the wire parallel with said surface, while the opposite edge lies between the planes of the two side flanges of the corresponding reel to receive the wire from said reel. The wire in extending from the reel to the pulley lies substantially parallel to both.

With the parts in the position indicated in Fig. 2 and with the reel-carrying member rotating counterclockwise, it is evident that the wires on the reels will be unrolled and wrapped around the cable. The reel-carrying member is positively rotated at a substantially uniform speed and the tension under which the wire is wrapped is controlled by the adjustment of the frictional resistance to the rotation of the reels.

The central opening through the reel-carrying member 10 is of approximately the same size as the diameter of the cable, so that the cable itself constitutes an axis or spindle for the rotation of the reel-carrying member. Any suitable bearing may be provided upon the inner peripheral surface of the member 10, to facilitate its rotation. In the specific form illustrated, I provide anti-friction bearing blocks 24, spaced apart at intervals along the inner peripheral face, but in place of these I may employ any other form of bearing, for instance, rollers.

For rotating the reel-carrying member, I provide a suitable framework extending longitudinally of the cable, and along this framework may travel a carriage having driving mechanism in operative engagement with the reel-carrying member. The framework may be of any suitable character, but is illustrated as including two clamps made up of transverse members, for engagement with opposite sides of a cable saddle B, and side tie rods 25, 25, for holding said transverse members in position. Extending upwardly from each clamp are two uprights 26, 26, and extending from each upright of one clamp to the corresponding upright of the opposite clamp is a track made up of two angle irons 27, 27. The two angle irons of each track are spaced apart a uniform distance throughout their length, and the two tracks are arranged parallel and opposite to each other. It is thus evident that the tracks are substantially parallel to each other and to the cable and extend longitudinally of the latter. Mounted to move along these tracks is a carriage made up of a suitable framework 28, and supporting wheels 29 in engagement with the tracks. Each supporting wheel is of a diameter substantially equal to the distance between the angle irons of its corresponding track, so that the carriage can not be lifted up off this track, but can only move lengthwise thereof. Each wheel is provided with a flange 30, for preventing the lateral movement of the carriage between the tracks. Mounted upon the carriage is an electric motor 31, connected by suitable gears, not shown, to a shaft 32 extending lengthwise of the carriage and below the motor. The gears are at one end of the carriage and are inclosed within a suitable gear casing 33, and at the opposite end of the carriage the shaft is provided with a flanged pinion 34, intermeshing with peripheral gear teeth 35 on the reel-carrying member 10. The pinion 34 is very small compared with the diameter of the reel-carrying member, so that the latter is rotated at a comparatively low speed. The pinion and reel carrier are held in mesh by the flanges on the pinion 34, and both are free to move lengthwise of the cable.

For automatically feeding the wheel carrier and the carriage along the cable, I rely

upon the tension of the wrapping wire and its crowding action as each new turn of the wire comes into engagement with the last turn of wire on the cable. As the wire is under tension, it tends to wrap about the cable in a single thickness, and each turn of the wire tends to assume a position adjacent to and not encircling the previous turn. This crowding action during the winding not only feeds the reel-carrying member and the carriage along the cable, but it also insures the close wrapping of the wire with successive turns as closely adjacent each other as it is possible to get them. Preferably, the outer surface of the longitudinal strands of the cables are coated with white lead or other similar material just in advance of the wrapping wire, so that the white lead or other filler will be forced into the spaces between the longitudinal strands and the wrapping wire.

As the cable is suspended at two points and sags between them, different portions of the cable are inclined at different angles to the horizontal. The particular portion illustrated in Fig. 1, is a portion adjacent one of the towers and extends at a comparatively steep angle to the horizontal. Along said portions of the cable I may employ a counterbalancing weight 36 connected by a cord 37 to the carriage, and passing over one or more pulleys 38 at the upper saddle B on the upper end of the track. This counterbalancing weight facilitates the movement of the carriage up the inclined track and renders its movement as easy as the movement along the track were it horizontal.

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

1. A cable-wrapping machine, comprising a track extending lengthwise of the cable and supported thereby, a member rotatable about the cable for delivering wire to the latter, and means movable along said track for rotating said member.

2. A cable wrapping machine, comprising uprights adapted to be rigidly secured to the cable and supported thereby, a track supported by said uprights and extending lengthwise of the cable, a prime mover movable along said track, and a member encircling said cable and supported thereby and rotated by said prime mover to deliver wrapping wire to the periphery of the cable.

3. A cable wrapping machine, comprising uprights adapted to be rigidly secured to the cable and supported thereby, a track supported by said uprights and extending lengthwise of the cable, a prime mover movable along said track, a counter-weight operatively connected to the prime mover to facilitate the movement of the latter along the track and a member encircling said cable and operated by said prime mover to deliver wrapping wire to the cable.

4. A cable wrapping machine, comprising uprights adapted to be rigidly secured to the cable and supported thereby, a track supported by said uprights and extending lengthwise of the cable, a prime mover movable along said track, a counter-weight operatively connected to the prime mover to facilitate the movement of the latter along the track, and a member encircling said cable and supported thereby and having a cable-carrying reel movable bodily around the cable upon the rotation of said member by said prime mover.

5. A cable wrapping machine, comprising a track extending longitudinally of the cable, a prime mover movable along said track, and means operated by said prime mover for wrapping the wire around the cable, said means being advanced along the cable by the action of the wrapping wire and the advancement of the prime mover along the track being controlled by the advancement of said means.

6. A cable wrapping machine, comprising two clamps adapted to engage with the cable, a track extending lengthwise of the cable and connected to said clamps to be supported thereby, a prime mover movable along said track, and means operated by said prime mover and movable along the cable for delivering wrapping wire to the surface of the latter.

7. A cable wrapping machine, comprising a member encircling the cable and supported thereby, a reel carried by said member at one side of said cable and movable bodily around the latter to deliver wire to the cable upon the rotation of the member, and a prime mover movable lengthwise of the cable for rotating said member, said member being automatically advanced by the delivery of wire to the cable, and said prime mover being advanced by the advancement of said member.

8. A cable wrapping machine comprising a track extended lengthwise of the cable and supported thereby; a carriage movable along said track; a rotary member mounted on said carriage and disposed concentric with said cable; a plurality of reels mounted on said rotary member in positions to balance the same; and means carried by said rotary member for guiding the wire from said reels to dispose the same upon said cable.

9. A cable wrapping machine comprising a track extended lengthwise of the cable and supported thereby; a carriage movable along said track; a rotary member mounted on said carriage to surround said cable and

disposed in concentric disposition therewith; means carried by said rotary member for wrapping wire around said cable; and means interposed between said rotary member and said wire for moving said rotary member lengthwise of said cable.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HOLTON D. ROBINSON.

Witnesses:
CLAIR W. FAIRBANK,
PHILIP D. ROLLHAUS.