(No Model.)

J. W. T. MORRIS.

MEANS FOR TRANSMITTING POWER.

No. 534,904. Patented Feb. 26, 1895.

Fig. 1.

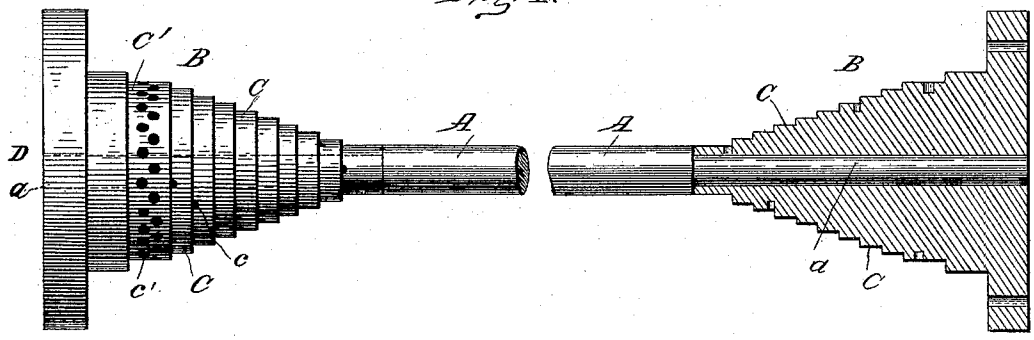


Fig. 2.

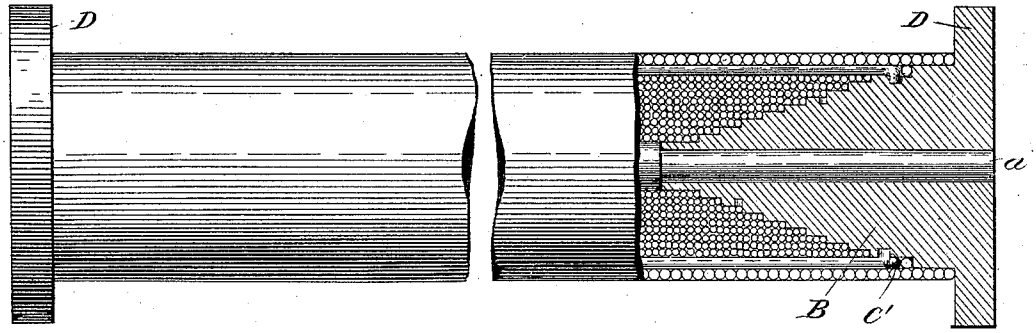
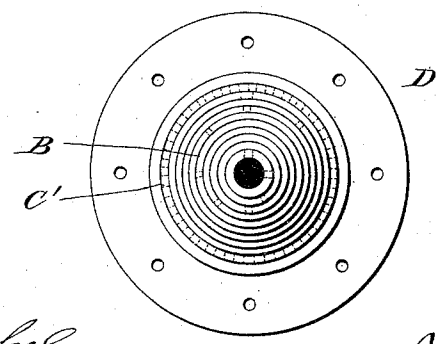


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN WM. THOS. MORRIS, OF SUMMERLAND, CALIFORNIA.

MEANS FOR TRANSMITTING POWER.

SPECIFICATION forming part of Letters Patent No. 534,904, dated February 26, 1895.

Application filed October 20, 1894. Serial No. 526,446. (No model.)

To all whom it may concern:

Be it known that I, JOHN WILLIAM THOMAS MORRIS, a citizen of the United States, residing at Summerland, in the county of Santa Barbara and State of California, have invented certain new and useful Improvements in Means for Transmitting Power; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in the construction of shafting, and has for its object to provide shafts adapted for heavy work, such as are used on ocean steamers and on other large machinery, which are strong and durable, and in which the strain thereon is brought in the direction of the length or grain of the material of which they are constructed.

In making my shafts I start with a core of small diameter, at the ends of which are secured two stepped cones, each step of which is provided with a recess for the insertion and attachment of the end of a wire, and which recesses are disposed in a spiral direction around the cone. The steps of the cone are of a thickness corresponding to the thickness of the wire, which is to be wound thereon and of a length to permit at least three coils of the wire to be wound thereon before said wire passes from the said step. At intervals, one of the said steps is provided with two series of openings or recesses, arranged in concentric rings around the same, close together, the recesses of one series being disposed opposite the spaces between the openings of the other series. These openings are for the attachment of wires which run longitudinally along the shaft for the purpose of strengthening the same in the direction of its length. Other holes may be made in the end flanges of the cones for the attachment of additional longitudinal wires. Upon the steps of the cone and upon the core, I wind wire, each layer of which is brazed or soldered to the part upon which it is wound, and I further string longitudinal wires thereon which are similarly brazed or soldered.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a side elevation, one end in section, of the core with its attached cones. Fig. 2 is a vertical, sectional view of a completed shaft, showing the manner of winding the core. Fig. 3 is a view of one of the cones in detail looking from the inside thereof.

Referring to the drawings now by letter, A represents the core, which, as shown, is a shaft of small diameter, to the ends of which are affixed the stepped cones B B. These may be either integral therewith, or be formed separately, the extensions *a a* of the core fitting tightly the centers of the said cones. The cones B B are formed with steps or ledges C C of a depth equal to the thickness of the wire to be wound thereon and of a length equal to a multiple of such thicknesses, each step having a recess *c* in its periphery and said recesses running in a spiral direction around said cone. At intervals, one of the steps, as C′, is formed with two concentric series of recesses or openings *c′ c′* arranged close together, the recesses of one series being disposed opposite the spaces between the openings of the other. The cones B B are further provided with outer flanges D D, by means of which and suitable connecting mechanism, as bolts, adjacent shafts may be secured together firmly and held in alignment. In winding, I first affix the end of the wire in the recess *c* of the inner step to prevent slipping on the cone and also solder or braze it to said cone. The said wire will therefore break before it will slip. I then wind the wire around the step of said cone, which is made wide enough to receive at least three revolutions of wire and continue the winding over upon the core, and from them over upon the cone at the other end of the core securing the end of the wire into the recess *c* therein. When this has been done, a second winding is started from the next step and continued as before, the successive windings continuing until the step C′ is reached. At this point, instead of winding wires, longitudinal wires are strung thereon parallel with the core A, the ends of said wires fitting the recesses *c′ c′* in said step. These longitudinal wires are for the purpose of giving strength to the shaft

in the direction of its length. Outside of these longitudinal wires, the winding is continued as before. For shafting of twelve inches diameter or less, one layer of longitudinal wires will be found sufficient, but more may be inserted if so desired. As the diameter of the shaft, thus being formed, increases, rods or bands may be used instead of wires, and the entire laminated structure is brazed or soldered, or heated and forged after the shaft is complete. I may also substitute thread, cord, or other fibrous material for the wire or bands, the same to be held in place by glue or other adhesive substance.

For reverse shafting, or shafting that is required to revolve in both directions, the wires will be wound in both directions to correspond.

It will be seen that by the construction just described, I provide a shaft that will sustain almost unlimited torsional as well as longitudinal strain, the said strain in all cases being applied in the direction of the length or grain of the material of which it is composed. I also provide a coupling means between aligning shafts which cannot be made from a wound core without the flanged cones used by me.

I have shown and described my invention in its preferred form, but it is obvious that many minor changes may be made therein without departing from the nature or spirit of my invention or sacrificing any of its advantages.

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

1. A shaft made of a core having stepped cones at the ends thereof, and layers of spirally wound and longitudinally strung wires thereon, substantially as described.

2. A shaft made of a core having stepped cones at the ends thereof, the steps of which are of a depth equal to the thickness of the wires to be wound thereon, and have recesses therein, wires having their ends fitting said recesses wound in layers on said steps and said core, and wires fitting other recesses in certain of said steps and strung longitudinally on the structure, the said cores having lateral flanges for the attachment of adjacent shafts, the whole laminated structure being soldered or brazed together, substantially as and for the purpose described.

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

JOHN WM. THOS. MORRIS.

Witnesses:
W. P. BUTCHER,
ABNER RUSH.