(No Model.)

B. S. MILES.

SHAFT FOR MACHINERY.

No. 259,893. Patented June 20, 1882.

Fig. 1.

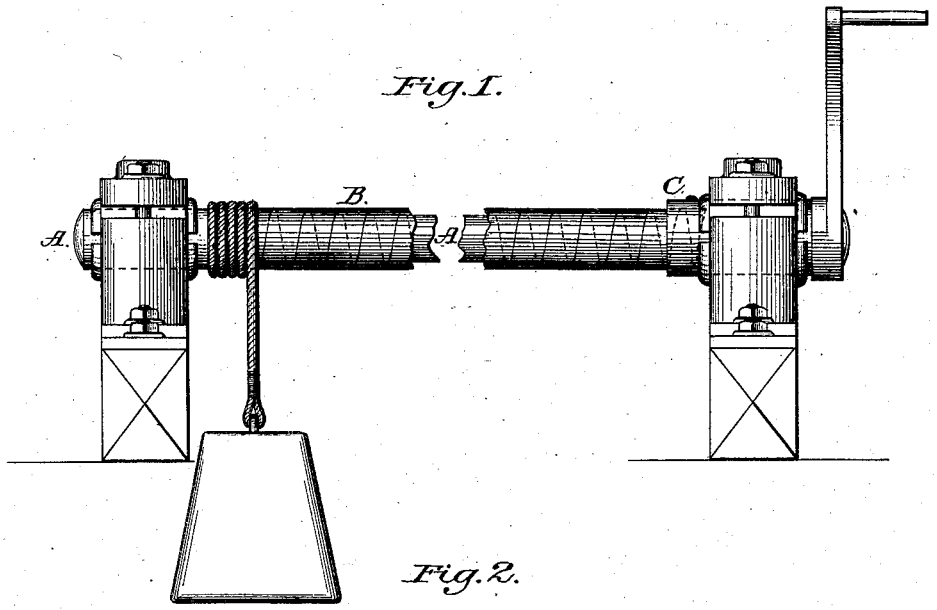


Fig. 2.

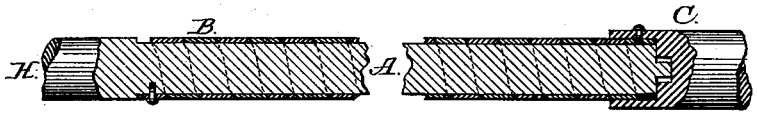


Fig. 3.

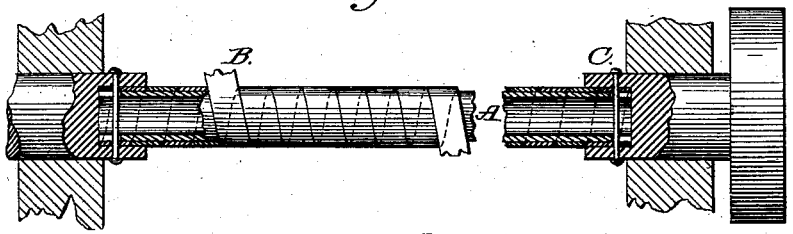


Fig. 4.

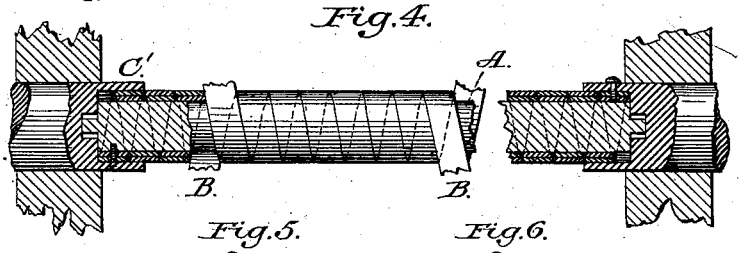


Fig. 5.

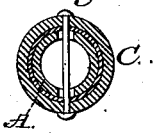
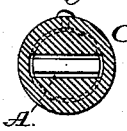


Fig. 6.



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UNITED STATES PATENT OFFICE.

BRADFORD S. MILES, OF GRAY'S SUMMIT, MISSOURI.

SHAFT FOR MACHINERY.

SPECIFICATION forming part of Letters Patent No. 259,893, dated June 20, 1882.

Application filed March 3, 1882. (No model.)

To all whom it may concern:

Be it known that I, BRADFORD S. MILES, a resident of Gray's Summit, Franklin county, Missouri, have invented certain new and useful Improvements in Compound Shafting; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The object of my invention is the construction of an inflexible shaft capable of resisting severe torsional strain, but which shall be lighter and cheaper than the shafts heretofore employed for the same work. This object is attained in my device by winding one or more spiral bands or strips of metal about and upon a comparatively light central shaft or core, one of the ends of each spiral band being connected to a cap adapted to encircle the end of the central shaft and form a continuation thereof, the opposite end of each band being fixed to the central shaft or core, so that the torsional strain upon the compound or re-enforced shaft shall be imparted primarily to the bands and converted into a tensile strain thereon, producing simply a compressive strain upon the inner core. As the tensile strength of a given weight of metal is much greater than its power to resist torsional strain, a comparatively light spiral band will bear and resist a degree of tension exerted thereon in the direction of its length by the twisting of the cap, which, if applied to produce the rotation of an ordinary shaft with the same resistance, would cause its fracture.

In the accompanying drawings, Figure 1 is an elevation of my improved compound shaft employed as a drum for lifting a weight; Fig. 2, a longitudinal central section of the same; Fig. 3, a longitudinal section of my shaft when constructed with a tubular central body or core; Fig. 4, an elevation, partly in section, illustrating the application of reversed spiral bands to the central shaft; and Figs. 5 and 6, transverse sections, illustrating the connection of the cap or sleeve with the end of the shaft and of its spiral band.

A is a rigid rod or shaft, constituting the core or body of my compound shaft. This central shaft may be of any material adapted to resist compression or a crushing force. It may be solid or tubular, my invention admitting of the use of hollow cast-iron for the core. This central core is re-enforced by means of one or more bars, bands, or strips, B B, of wrought-iron or steel wound around the same from end to end in a close continuous spiral. These spiral bands are each secured at one end to the central core or shaft and at the other to a cap or head, C, so fitted upon the shaft as to have a slight rotary play or movement thereon sufficient to permit it, before engaging the shaft, to draw upon the spiral bands, and thus cause them to bind the shaft snugly.

In the construction of a compound or re-enforced shaft requiring no very great strength the body or core may be of wood, and such a shaft re-enforced by two flat bars of iron coiled around it is illustrated in Fig. 1. Where the shaft is to be subjected to reverse movements and torsional strain in opposite directions I re-enforce it with two sets of spiral bars coiled thereon, each in an opposite direction. (See Fig. 4.)

The partial rotation of the caps C, whereby torsional strain is imparted to the spiral bars before the central shaft is engaged, is limited either by a recess in the inner face of the cap adapted to receive an offset on the end of the shaft, (see Figs. 2 and 6,) or by a pin passing through a transversely-elongated aperture in the shaft, (see Figs. 3 and 5,) so that the lost motion of the cap will be arrested at the proper moment to prevent too great compressive strain on the central core, and to bring the latent strength of said core into play as an auxiliary to the tensile strength of the spiral bars.

The transmission of power to or from the compound or re-enforce shaft A B is invariably produced through the cap or head C, so that the torsional strain shall be imparted to the spiral bands, in the first instance, by drawing and winding them directly and closely upon the central core or shaft before the influence of the torsion shall be brought to bear thereon. The torsion is thus not only resisted by the tensile strength of the spiral bands, but these bands are brought to bear upon the central

shaft to bind and clamp it closely and along its length, and thus greatly re-enforce and strengthen it.

I disclaim the use of one or more spiral bands made fast at one end to a rotating shaft when adapted for use as a clutch or friction coupling, as shown in Letters Patent No. 192,012, of June 12, 1877.

What I claim as new, and desire to secure by Letters Patent, is—

A rotating shaft wrapped and re-enforced along its effective length by one or more spiral bands clasping and binding the same, each made fast thereto at one end, and at the other to a sleeve, collar, or cap fitted upon the shaft to engage the same, after a partial independent rotary movement thereon, substantially as herein described.

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

BRADFORD S. MILES.

Witnesses:
R. M. HENDERSON,
HY. J. MAID.