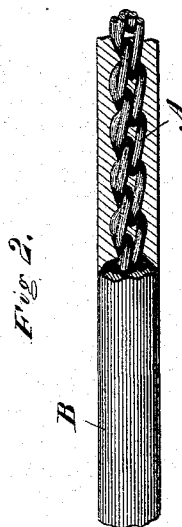
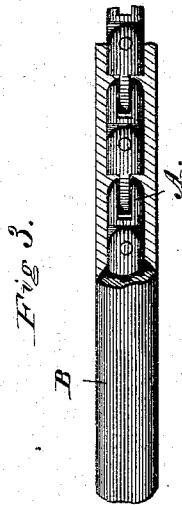
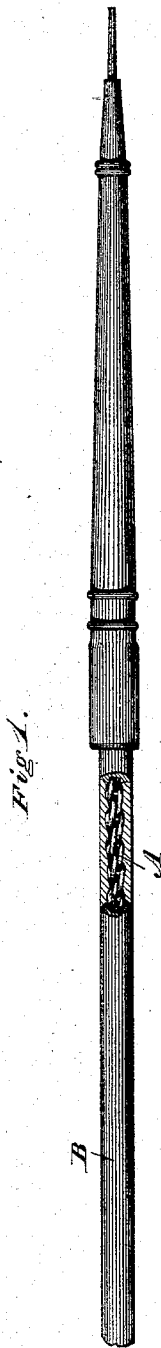


E. T. STARR.

Flexible Shafts for Dental Engines.

No. 158,325.

Patented Dec. 29, 1874.



WITNESSES

Harry King
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UNITED STATES PATENT OFFICE.

ELI T. STARR, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO SAMUEL S. WHITE, OF SAME PLACE.

IMPROVEMENT IN FLEXIBLE SHAFTS FOR DENTAL ENGINES.

Specification forming part of Letters Patent No. **158,325**, dated December 29, 1874; application filed December 14, 1874.

CASE B.

To all whom it may concern:

Be it known that I, ELI T. STARR, of the city and county of Philadelphia, in the State of Pennsylvania, have invented an Improved Flexible Shaft for Dental Engines, of which the following is a specification:

The object of my invention is to secure a rotating shaft for transmitting power from the prime mover to the operating tool, which shall be capable of flexing freely without interrupting the transmission of the driving-power, while sufficiently rigid against torsional strains.

The coiled-wire-spring cables or shafts heretofore used for this purpose have been found in practice to possess defects which it is my object to remove; to which end my improvement consists in combining a cable with an envelope of rubber, gutta-percha, or equivalent material, which closely embraces and rotates with the cable.

In the accompanying drawings, Figure 1 shows a view, partly in section, of my improved flexible shaft, connected with the hand-piece of a dental engine. Fig. 2 represents a similar view of a shaft on a larger scale, and Fig. 3, a modification thereof.

In order to carry out my invention in the best way now known to me, I employ a core, A, consisting of a chain or cable composed of links of twisted wire, as shown in Figs. 1 and

2, or of a series of pin-jointed slotted links, as shown in Fig. 3. This latter form of cable is not, however, herein claimed *per se*, as it forms the subject-matter of Letters Patent granted to me December 8, 1874.

This central core or cable is inclosed by well-known means within a closely-adhering envelope, B, composed of rubber or gutta-percha, which forms an integral part of the shaft, and of course rotates with it. In practice I have found this shaft to possess great flexibility and capacity for transmitting motion steadily, and without springing or jumping. I am also enabled by this construction to dispense with a non-rotating flexible sheath heretofore employed, thus simplifying the cost of the mechanism and lessening its liability to derangement, while avoiding the danger of entangling the hair of the patient with the rotating shaft.

I claim—

The flexible shaft hereinbefore set forth, consisting of the combination of a flexible metallic cable and a closely-adhering envelope of rubber or gutta-percha.

In testimony whereof I have hereunto subscribed my name.

ELI T. STARR.

Witnesses:

JAS. B. WILLIAMS,
FRANK L. HISE.