

No. 723,135.

PATENTED MAR. 17, 1903.

A. W. BROWNE.
SLEEVE FOR FLEXIBLE SHAFTING.

APPLICATION FILED JUNE 11, 1902.

NO MODEL.

FIG. 2.

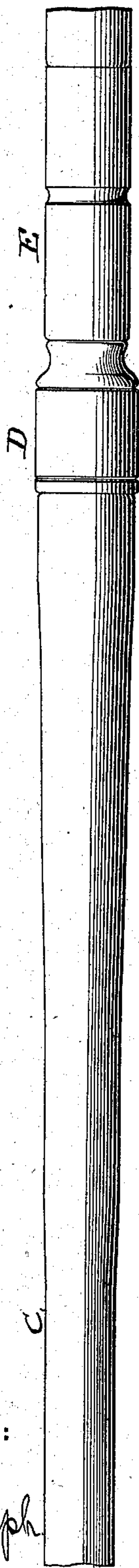
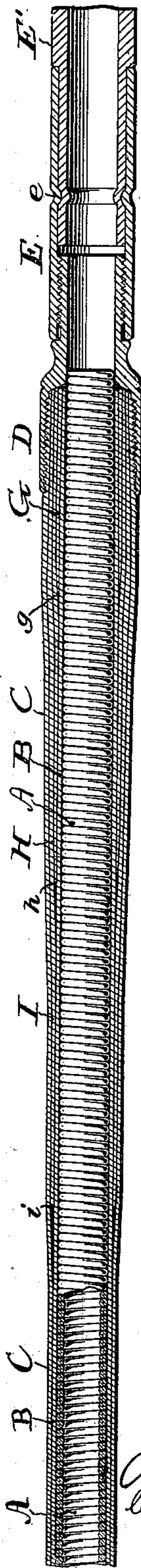


FIG. 1.



FIG. 3.



WITNESSES:

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ARTHUR W. BROWNE, OF PRINCEBAY, NEW YORK, ASSIGNOR TO THE S. S. WHITE DENTAL MANUFACTURING COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

SLEEVE FOR FLEXIBLE SHAFTING.

SPECIFICATION forming part of Letters Patent No. 723,135, dated March 17, 1903.

Application filed June 11, 1902. Serial No. 111,092. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR W. BROWNE, a citizen of the United States, residing at Princebay, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Sleeves for Flexible Shafts; 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 certain improvements in sleeves or sheaths for flexible shafts, particularly designed for dental engines.

The principal object of my invention is to strengthen or reinforce such sleeves at and near their inner fixed ends for the purpose of preventing the sleeves and shafts from becoming permanently bent or set, which is liable to occur unless some means are employed to overcome it.

In the accompanying drawings, which indicate a single exemplification of my invention, Figure 1 is an exterior view on a scale smaller than the actual size. Fig. 2 is a similar view on an enlarged scale, showing the inner end of the sleeve and its end connection, the outer or free end of the sleeve being omitted. Fig. 3 is a longitudinal central sectional view of the parts shown in Fig. 2, the flexible shaft or cable not being shown.

The best form of sleeve for dental-engine flexible shafts now made may be described as follows: The inner member of the sleeve (indicated at A) consists of a flexible coiled wire tube extending the entire length of the sleeve and in which the flexible shaft or cable is adapted to rotate. Closely surrounding said inner member A is a textile covering B, preferably woven thereon and technically called the "weaving." This in turn is surrounded by a textile covering C, constituting the outer member of the sleeve, which is preferably braided upon the weaving and technically called the "braiding." The opposite extremities of the sleeve are provided with end pieces or ferrules having threaded connection with the sleeve, the end piece D at

the inner end of the sleeve being attached to a metal tube E, having connection with the engine-head, and the end piece F being for the attachment of the handpiece.

When the handpiece is not in use, the flexible shaft and its sleeve often hang vertically from the engine-head, the shaft and sleeve curving at and near its inner fixed end. This curve or bend in the shaft and sleeve is liable to become permanent or set after long use and the smooth running of the shaft thereby impaired. To overcome this difficulty, numerous devices have been employed for preventing the too-abrupt curving of the shaft and sleeve; but so far as I am aware these have all been independent adjuncts of the sleeve and arranged exteriorly thereof. It is the object of my invention to strengthen the sleeve at this point by means of a reinforce constituting a component part of the sleeve and preferably arranged interiorly thereof. This may be accomplished by increasing the external diameter of the sleeve at and near its inner end without increasing the internal diameter, the reinforce thus formed extending a suitable distance toward the opposite end of the sleeve—say about one-fifth the length of the sleeve, more or less—and by preference gradually decreasing in diameter.

Obviously the reinforce contemplated by my invention may be effected in various ways; but I deem it necessary to illustrate and describe but the single construction shown in the drawings. This consists of a series of tubes G, H, and I of different lengths introduced between the inner and outer members of the sleeve, these tubes, in this instance, being of textile material. The tube G is woven directly upon and around the weaving B and extends from the inner extremity of said weaving to a point indicated at *g*. The tube H is woven directly upon and around the tube G as far as said tube extends and is then woven directly upon and around the weaving B and extends to the point marked *h*. The tube I is woven directly upon and around the tube H and also upon the weaving B and extends to the point *i*. The outer covering C

is braided directly around the tube I and is thence continued to the opposite end of the sleeve in direct contact with the weaving B.

A sleeve provided with a reinforce such as I have just described is practically rigid for a short distance from its inner end and becomes flexible beyond this point, the flexibility gradually increasing until the reinforce tapers off to the diameter of the sleeve proper. In this way the flexure of the sleeve when hanging loose is not so abrupt as in a sleeve not provided with the reinforce, the tendency of the curve or bend of the sleeve and shaft becoming set thus being overcome. The reinforce being incorporated with the sleeve and also being, as I now prefer to construct it, inside the outer covering thereof, I have produced a sleeve which is not only strong and durable and slightly in appearance, but one which obviates a common fault in the present style of sleeve and at the same time dispenses with the use of all independent and external supports.

Instead of rigidly connecting the sleeve to the engine-head by way of its inner end piece E, as usual, I have employed a swiveling connection, whereby the sleeve may be turned when desired. Any suitable swiveling connection may be used; but that shown in the drawings consists of a simple swivel connection *e* between the sections E and E' of the metal tube which connects the sleeve to the engine.

I am aware that a tapered flexible driving-shaft and a correspondingly-tapered sleeve or sheath are old; but I do not broadly claim a tapered sleeve the external and internal surfaces of which are parallel longitudinally.

I claim as my invention—

1. A sleeve for flexible shafts provided with

a reinforce at and near its inner end, said reinforce being a component part of said sleeve, as and for the purpose set forth.

2. A sleeve for flexible shafts provided with a reinforce at and near its inner end, said reinforce being a component part of said sleeve and tapering toward the outer end thereof, as and for the purpose set forth.

3. A sleeve for flexible shafts provided at and near its inner end with a tapered reinforce which is located between the inner and outer members of said sleeve, as and for the purpose set forth.

4. A sleeve for flexible shafts, which at and near its inner end is of increased external diameter, the internal diameter of which is substantially the same throughout its entire length, as and for the purpose set forth.

5. A sleeve for flexible shafts which at and near its inner end is of increased external diameter, this increased diameter gradually diminishing toward the opposite end of the sleeve, the internal diameter of which is substantially the same throughout its entire length, as and for the purpose set forth.

6. In a sleeve for flexible shafts, the inner member, a covering surrounding said inner member, a series of tubes of different lengths surrounding said covering at and near the inner end of the sleeve, and an outer member surrounding said tubes and said covering, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR W. BROWNE.

Witnesses:

R. W. WOOD,
A. F. DECKER.