(No Model.)

A. W. BROWNE.

BALL BEARING FOR DENTAL ENGINE SHAFTS.

No. 558,772. Patented Apr. 21, 1896.

FIG. 1.

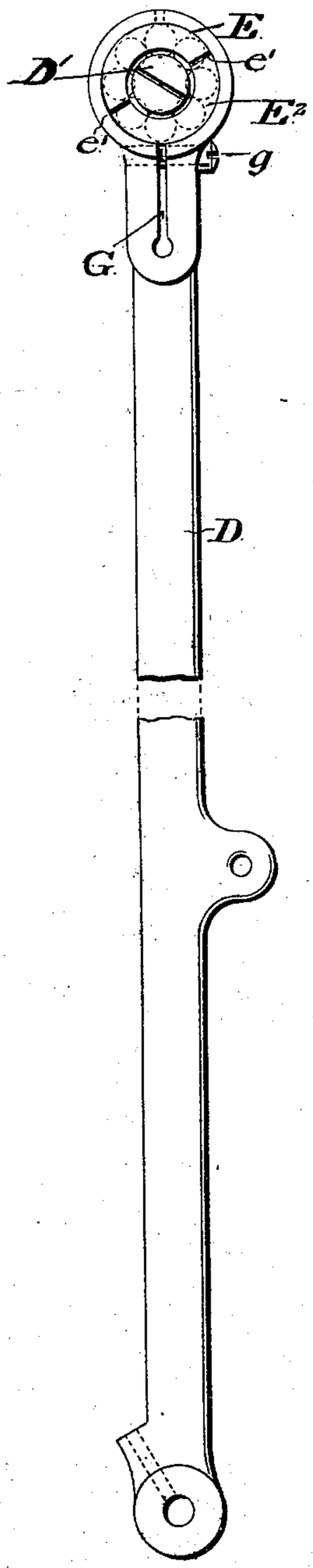

FIG. 2.

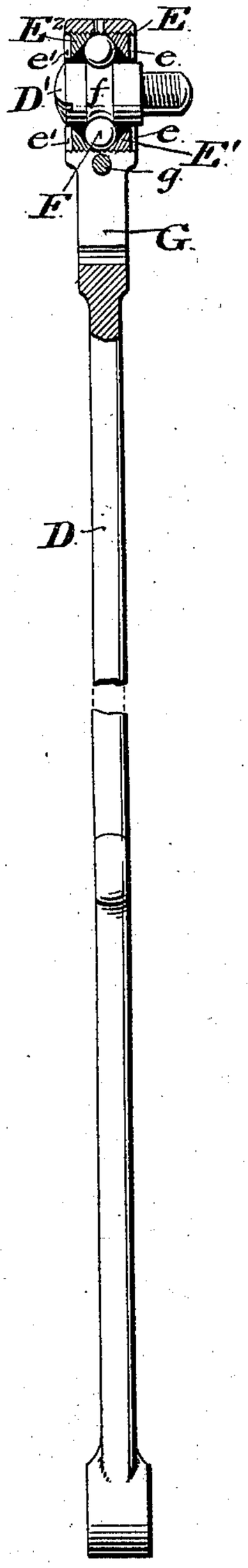

FIG. 3.

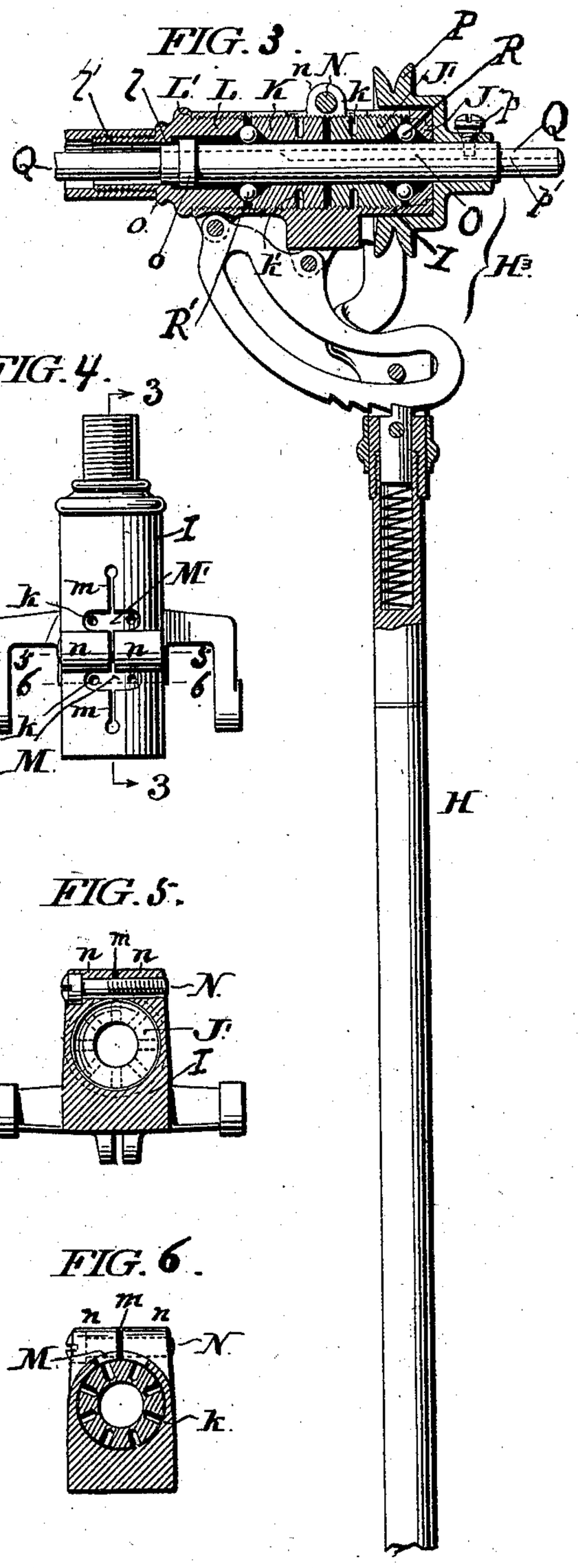

FIG. 4.

FIG. 5.

FIG. 6.

WITNESSES:

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UNITED STATES PATENT OFFICE.

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

BALL-BEARING FOR DENTAL-ENGINE SHAFTS.

SPECIFICATION forming part of Letters Patent No. 558,772, dated April 21, 1896.

Application filed October 18, 1895. Serial No. 566,072. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR W. BROWNE, a citizen of the United States, residing at Prince's Bay, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Ball-Bearings for Dental-Engine 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 dental engines, as hereinafter claimed, applicable to the bearings for the driven shafts by way of which motion is communicated to the tools to be operated.

In the accompanying drawings, Figure 1 is a view in elevation of the pitman and the crank-pin having ball-bearing connection therewith and adapted for attachment to the crank of the driving-shaft, and Fig. 2 is a view partly in vertical central section and partly in elevation at a right angle with Fig. 1. Fig. 3 is a view partly in elevation and partly in vertical central section, as indicated by the line 3 of Fig. 4, showing the upper portion of the engine-standard, the pulley-head mounted at the top thereof, a portion of the driven shaft by way of which motion is communicated to the tool to be actuated, and the bearings for this shaft. Fig. 4 is a plan view showing a portion of the pulley-head with attachments thereof. Fig. 5 is a view, partly in elevation and partly in section, on the line 5 of Fig. 4; Fig. 6, a view, partly in elevation and partly in section, on the line 6 of Fig. 4.

A dental engine of suitable construction for the application of my improvements is shown in United States Letters Patent No. 460,687, dated October 6, 1891. As in said patent, provision is made for imparting motion by way of a treadle and pitman to a cranked driving-shaft and a driving-wheel thereon.

An adjustable ball-bearing connection between the pitman D and the pin D′, which is secured to the driving-shaft crank, is made in the following way: A bearing-opening E is provided in the enlarged upper end or head of the pitman, and this opening is screw-threaded to receive the two externally-threaded short sleeves E′ E^2, which are formed with the annular inclined inner surfaces *e e*, thus adapting them to serve as cone-bearing sleeves, which may be screwed in place and adjusted, as desired, by means of a spanner-wrench adapted to engage the slots or nicks *e′* in them. The crank-pin passes through the cone-bearing sleeves loosely or out of contact with them and is provided with the annular groove *f*, concave in cross-section and constituting a bearing-surface in contact with the antifriction-balls F, which are inclosed in the bearing-opening between the cone-bearing sleeves.

A slot G is formed in the pitman near its upper end and extends to the bearing-opening, and a clamp-screw *g*, passing through the pitman and crossing the slot at or near its upper end, serves to slightly vary the size of the bearing-opening and so adapt it to properly embrace the cone-bearing sleeves.

It will be seen that the parts may be quickly assembled to work with the least possible friction, and readily separated, and that wear may be taken up or compensated for by slight adjustment of the bearing-sleeves, while by adjustment of the screw *g* the bearing-sleeves may be clamped against accidental movement in the bearing-opening. Engagement of the balls with the grooved surface of the crank-pin obviously prevents the pitman from becoming disconnected from the crank-pin.

The rocking upright or standard H of the engine is made in sections, so as to be adjustable in length, and carries a vertically-rocking and horizontally-turning pulley-head H^3 at its upper end, as is well understood.

Instead of the usual way of mounting the driven shaft by way of which motion is imparted to the tool to be operated, this shaft is mounted as follows: The tubular portion I of the pulley-head provides a bearing-opening, in which the bearings for the driven shaft are mounted. This bearing-opening is provided at one end with an inclined or cone-bearing surface shown as formed by a short cone-bearing sleeve J, suitably fastened in place. Slightly separated from this fixed cone-bearing sleeve is a longer cone-bearing

sleeve J′, adjustable in the bearing-opening toward and from the fixed bearing-sleeve. This adjustable sleeve is screw-threaded to engage the threaded bearing-opening. Another cone-bearing sleeve K is adjustable in the bearing-opening, with which it has screw-threaded connection, and projecting into the end of the bearing-opening opposite that provided with the fixed cone-bearing sleeve J is a cone-bearing sleeve L, which is screw-threaded for engagement with the threaded bearing-opening. A shoulder L′ on the sleeve L abuts against the end of the tube I, constituting the bearing-opening of the pulley-head when this sleeve is tightly screwed in place, so as to leave a slight space between its inclined inner end and the adjacent inclined end of the bearing-sleeve K. Holes *k k′* are formed around the adjustable cone-bearing sleeves J′ K, and the pulley-head tube is formed with two transverse slots M M′, through which a pin may be inserted to engage the holes in the sleeves J′ and K to turn and adjust them. A slot *m* extends longitudinally of the pulley-head tube part way its length over the adjustable cone-bearings, and a clamp-screw N, passing through the lugs *n n* at opposite sides of the slot *m*, serves to compress the tube and securely clamp the adjustable cone-bearing sleeves in their position of adjustment.

Within the cone-bearing sleeves, but not in contact with them, is the tubular journal O of the driven shaft. This journal projects at one end beyond the bearing-opening and has the driven pulley P fastened to it by a screw *p* passing through the hub of the pulley. An annular shoulder or collar *o* is provided upon the journal O near its end opposite that to which the pulley is secured, and the end cone-bearing sleeve L has an internal shoulder *l* formed upon it, which serves to limit outward movement of the tubular journal. This bearing-sleeve has its reduced end portion *l′* externally threaded for making connection in a well-known way with the sheath of the ordinary flexible driving-shaft. The stiff section Q of such flexible driving-shaft is mounted in the journal O and revolves with it. The screw *p*, entering the groove *p′* extending longitudinally of the shaft-section Q, (see dotted lines, Fig. 3,) causes it to rotate with the driven pulley and journal, while allowing it to have desirable slight endwise movement. Antifriction-balls R in contact with the driven-shaft journal O are confined between the inclined surfaces of the cone-bearing sleeves J and J′, and other antifriction-balls R′, against which the journal bears, are confined between the inclined bearing-surfaces of the sleeves K and L.

It will be seen that the various parts of the driven-shaft bearings may be readily arranged in the bearing-opening of the pulley-head and quickly detached, and that by adjustment of the pair of adjustable cone-bearing sleeves the balls may be kept in proper working contact with the journal and with the inclined surfaces of their respective bearing-sleeves, wear of the parts being easily taken up or compensated for.

I claim as my invention—

1. The combination, in a dental engine, of the pulley-head provided with the bearing-opening, the two non-adjustable cone-bearing sleeves, one within each end of said opening, the two cone-bearing sleeves between said non-adjustable sleeves, having threaded connection with the bearing-opening, adapted to be clamped therein, and independently adjustable to operate the one with the non-adjustable cone-bearing sleeve at one end of the bearing-opening and the other with the non-adjustable cone-bearing sleeve at the opposite end of the bearing-opening, the journal in the cone-bearing sleeves, the two sets of balls in contact with the journal and with their respective adjustable and non-adjustable bearing-sleeves, and means by which both the adjustable cone-bearing sleeves may be either simultaneously clamped in position or simultaneously unclamped for adjustment without disarranging the parts, substantially as and for the purpose set forth.

2. The combination, in a dental engine, of the pulley-head provided with the tubular portion constituting the bearing-opening and having the transverse slots, the longitudinal slot, and the lugs at opposite sides of this longitudinal slot, the clamp-screw passing through the lugs, the two non-adjustable cone-bearing sleeves in the bearing-opening, the two adjustable cone-bearing sleeves in the bearing-opening, provided with the circumferential holes, the journal in the cone-bearing sleeves, and the two sets of balls in contact with the journal and with their respective bearing-sleeves, substantially as set forth.

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

ARTHUR W. BROWNE.

Witnesses:
SEYMOUR CASE,
M. A. COLE.