

N. A. STRAND.
FLEXIBLE SHAFTING.
APPLICATION FILED NOV. 11, 1918.

1,297,034.

Patented Mar. 11, 1919.

Fig. 1.

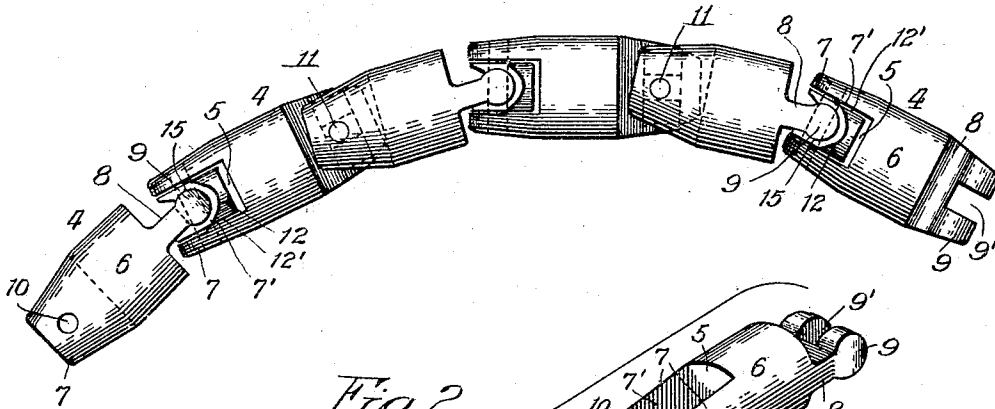


Fig. 2.

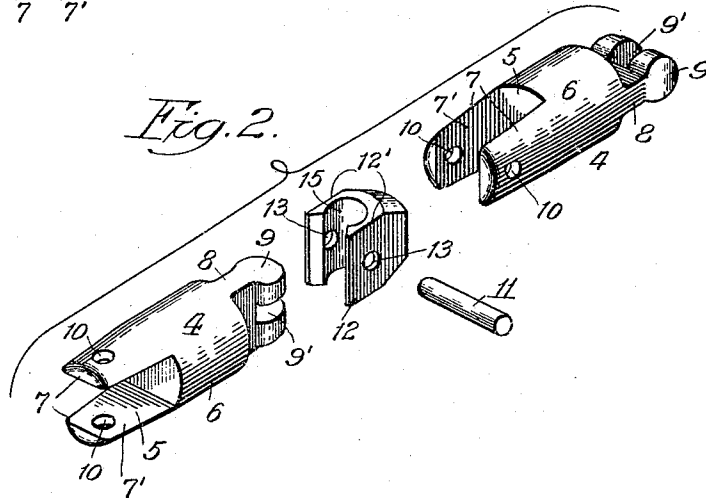
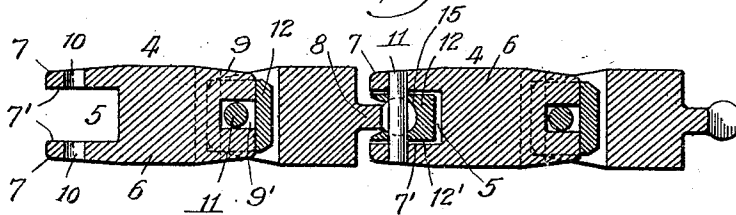


Fig. 3.



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UNITED STATES PATENT OFFICE.

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FLEXIBLE SHAFTING.

1,297,034.

Specification of Letters Patent. Patented Mar. 11, 1919.

Application filed November 11, 1918. Serial No. 261,952.

To all whom it may concern:

Be it known that I, NELS A. STRAND, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Flexible Shafting, of which the following is a full, clear, and exact description.

The invention relates to flexible shafting in which the sections are connected for universal relative movement.

One object of the invention is to provide an improved flexible shaft in which the pivot pins for holding the sections together are relieved from excessive stresses and wear. A further object of the invention is to provide an improved construction which is durable and can be produced at a low cost.

The invention consists in the several novel features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings: Figure 1 is an elevation of a flexible shaft embodying the invention. Fig. 2 is a perspective of the parts disassembled. Fig. 3 is a longitudinal section.

The shaft comprises connected sections 4 each having an integral body portion 6, a slot 5, forming a bifurcated terminal 7 at one end and a reduced portion 8 provided with cylindrical terminals 9 at the other end. The bifurcated end 7 has holes 10 therein for a connecting pin 11. The sections are alike in construction, but are alternately assembled so that the bifurcated portions are disposed at right angles to one another.

An intermediate member or block 12 is disposed in the bifurcated end 7 of each shaft-section and is provided with holes 13 through which the connecting pin 11 passes to pivotally connect the block and the bifurcated end of one shaft-section. The sides 12' of these intermediate members or blocks 12 are flat to conform to the flat sides 7' of the bifurcated portion of the sections to serve as abutting driving surfaces between the sections. Each intermediate member or block 12 is provided with a cylindrical bearing 15 having its axis transverse to the axis of the pin 11 and the cylindrical terminal 9 of a contiguous shaft-section fits in said bearing to form driving surfaces between the intermediate member or block and the adjacent section. The pin 11 preferably passes between the cylindrical terminals 9 so that there will be no material driving

stress upon the pins 11 and the latter serve primarily to hold the intermediate member and one shaft section in pivotal driving relation, while the cylindrical terminals of the other section and the cylindrical surface will form the driving surfaces between the intermediate block and the latter section. In other words, the driving stresses are not applied to any material extent through the pivot or connecting pins. The pin in passing through the slot 9' between the terminals 9 serves to hold them against longitudinal movement in the cylindrical bearing or socket 15.

In assembling the shaft, the intermediate block is slipped over the cylindrical terminals of one section and then slipped into the bifurcated portions of the next section and then the pin 11 is passed through the holes 10 and 13, whereupon, the joint between the intermediate member and adjacent section will be complete. The intermediate section is pivotally movable relatively to one section around the pivot pin 11, while the socket 15 and terminals 9 form a pivotal connection between the intermediate member and the other section, so that there is, in effect, a universal joint between the adjacent sections.

The invention exemplifies a flexible shaft which is formed of sections and in which the intermediate members provide universal connections and driving surfaces which do not subject the pivot pins to excessive wear or stresses. The intermediate members and sections are formed so that they can be easily machined.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. The combination in a flexible shaft of a series of sections, each having one of its ends bifurcated and the other provided with a bearing terminal, intermediate members between the bifurcated terminals and the cylindrical terminals of adjacent sections having driving surfaces to engage the adjacent ends of the sections, and means to hold the intermediate members and sections in connected relation.

2. The combination in a flexible shaft, of

a series of sections, each having a slot in one of its ends and the other provided with a cylindrical terminal, intermediate members in said slots and between the bifurcated terminals engaging the cylindrical terminals of adjacent sections, and means to hold the intermediate members and sections extending transversely to the axis of the cylindrical terminals to hold the intermediate members and sections in connected relation.

3. The combination in a flexible shaft of a series of sections, each having one of its ends bifurcated and the other provided with a cylindrical terminal, intermediate members between the bifurcated terminals and the cylindrical terminals of adjacent sections, and pins to hold the intermediate members and sections in connected relation.

4. In a flexible shaft, the combination of a series of sections each having a bifurcated terminal at one end and a cylindrical por-

tion at the other end, intermediate members having substantially flat driving surfaces for engaging corresponding surfaces on the bifurcated ends and cylindrical sockets to receive the cylindrical terminals of the other members, and pivot pins connecting the bifurcated terminals and the intermediate members.

5. In a flexible shaft, the combination of a series of sections, each having a bifurcated terminal at one end and a cylindrical portion at the other end, intermediate members having driving surfaces for engaging corresponding surfaces on the bifurcated ends and cylindrical sockets to receive the cylindrical terminals of the other members, said cylindrical portion having slots therein and pivot-pins connecting the bifurcated terminals and the intermediate members and passing through said slots.

NELS A. STRAND.

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