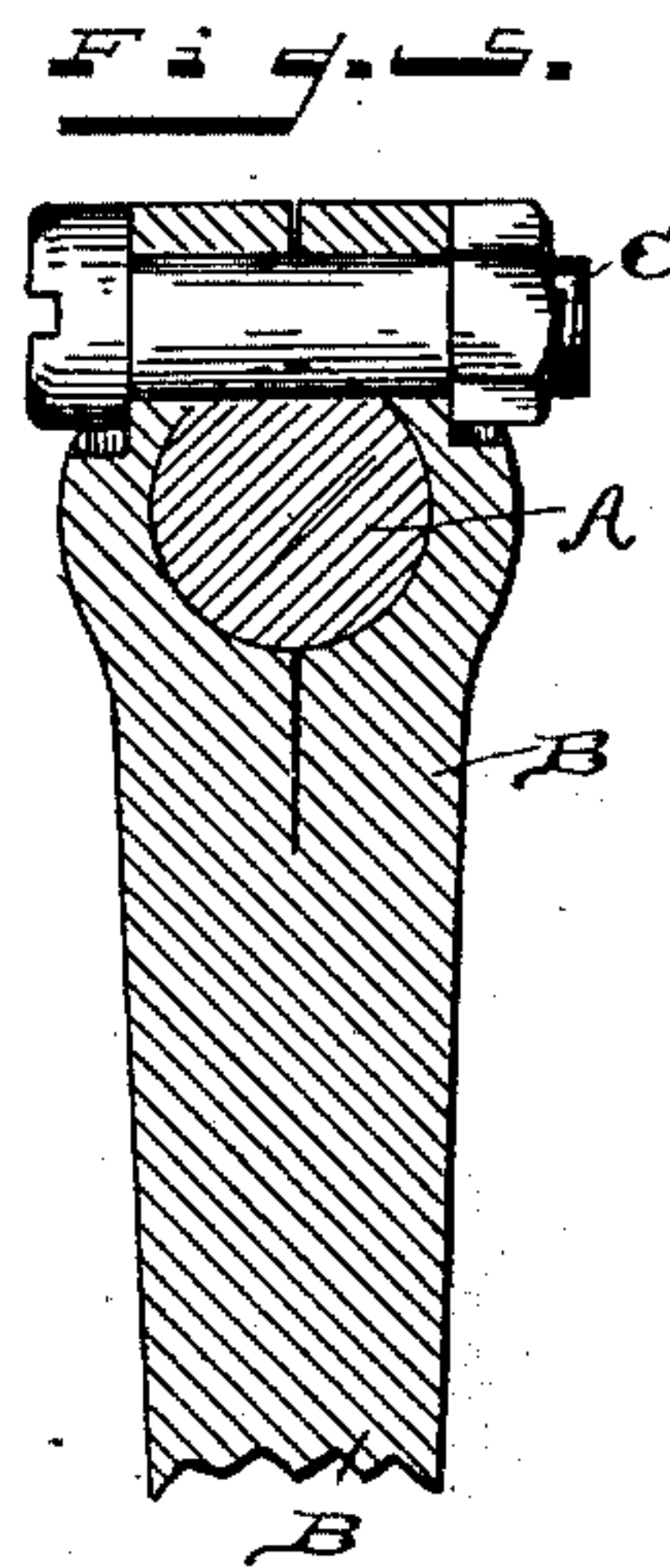
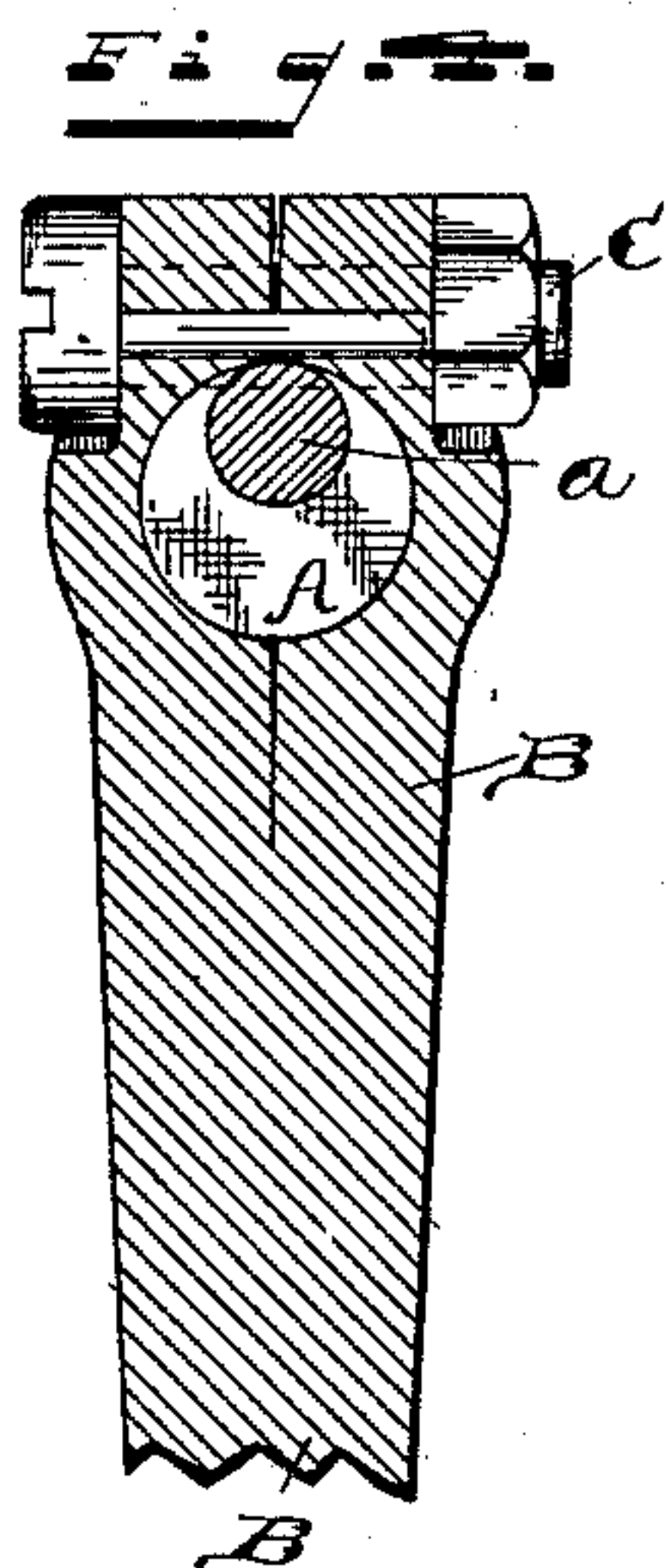
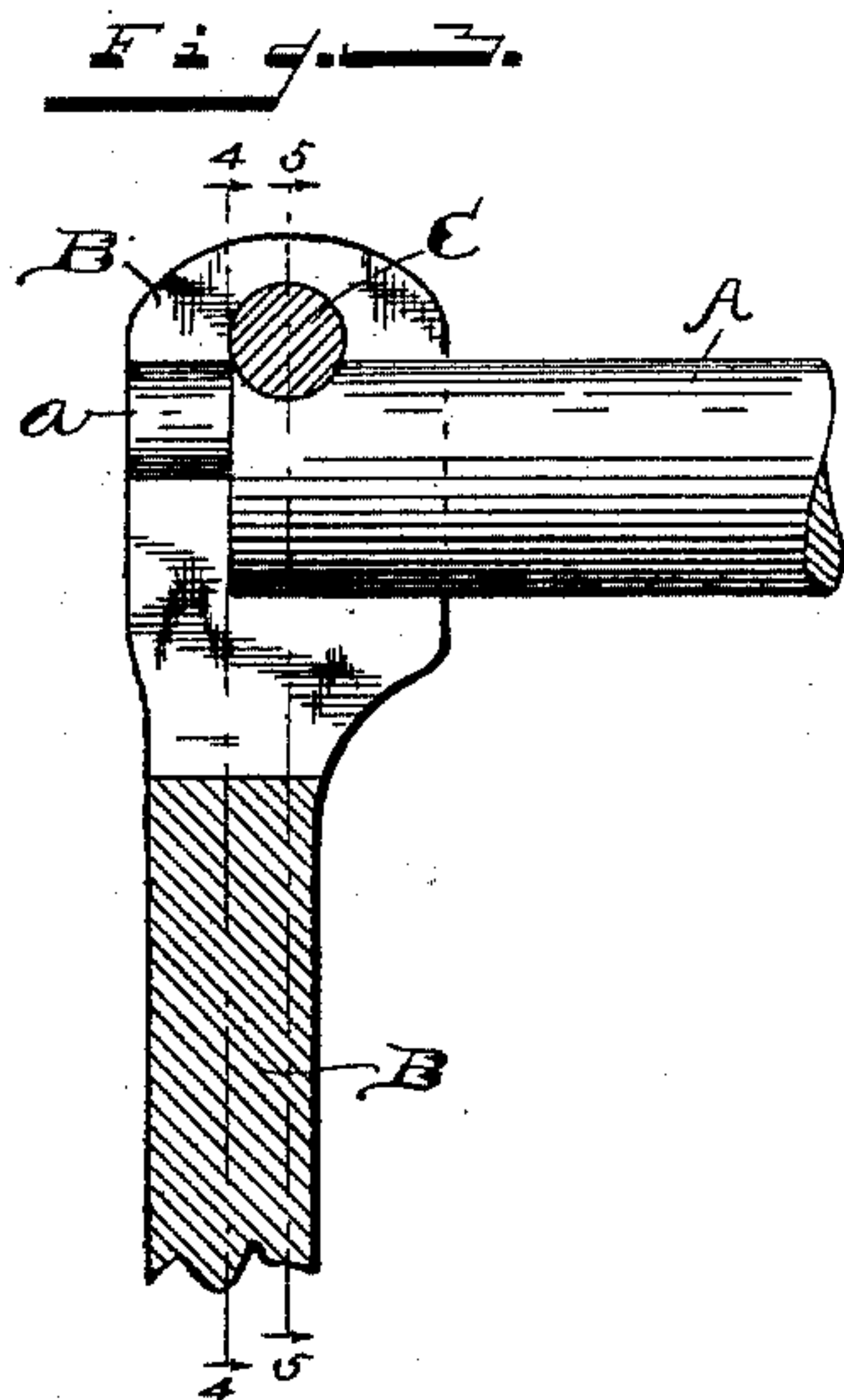
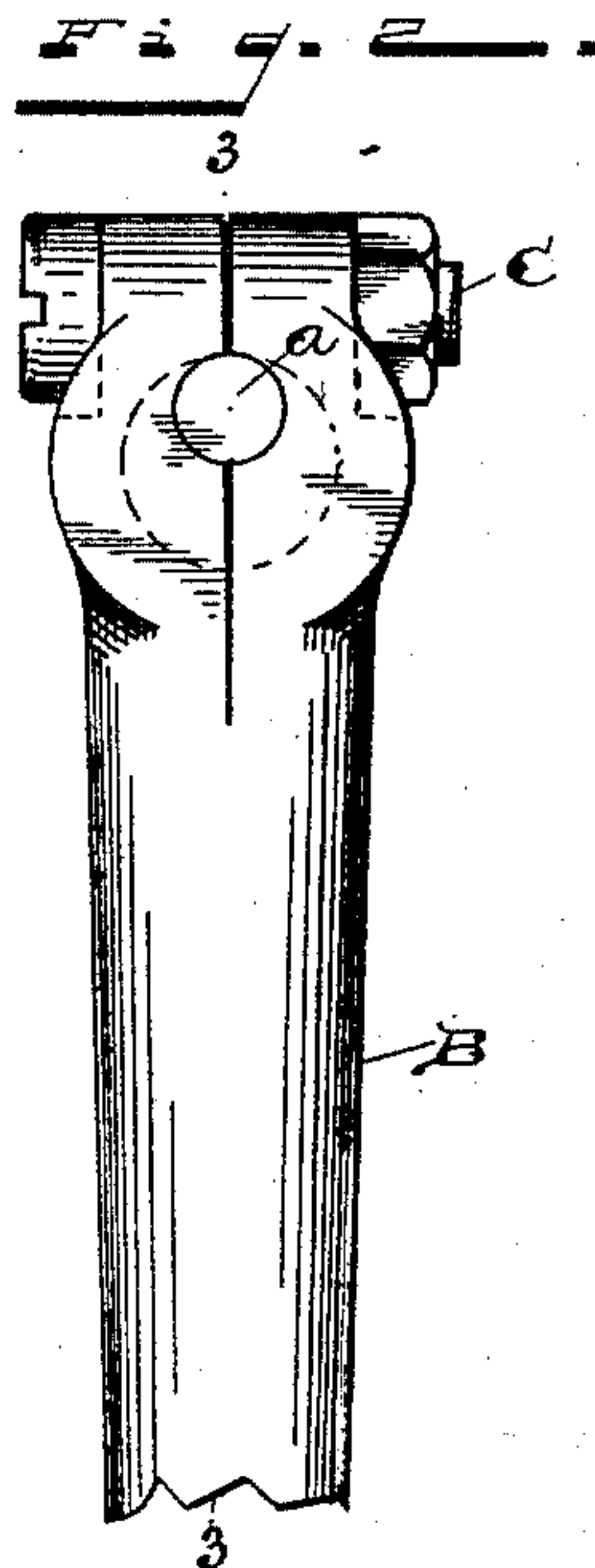
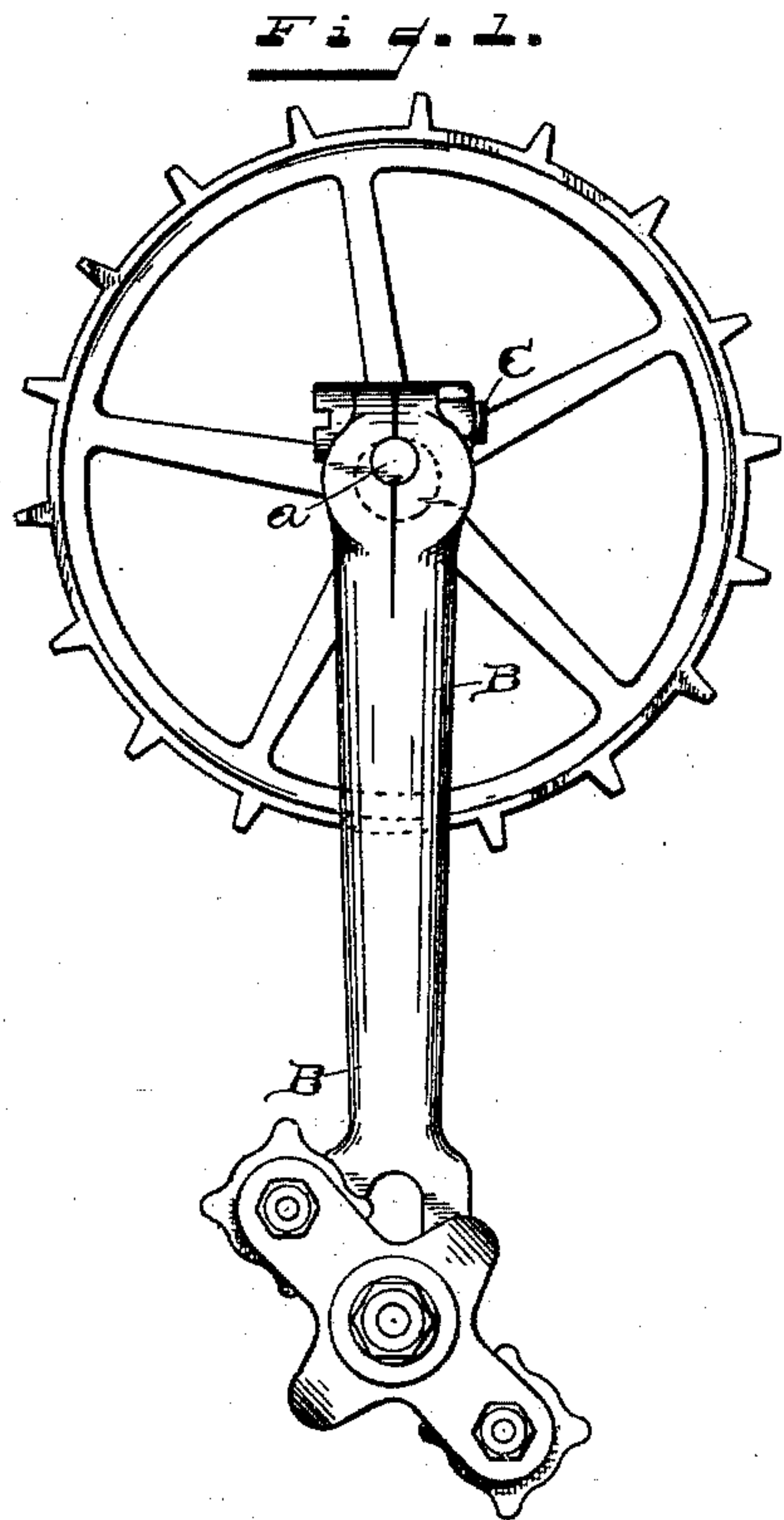


(No Model.)

A. P. MORROW.
CRANK ARM AND SHAFT.

No. 485,350.

Patented Nov. 1, 1892.



WITNESSES:

F. W. Warner.
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UNITED STATES PATENT OFFICE.

ALEXANDER P. MORROW, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO THE
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CRANK ARM AND SHAFT.

SPECIFICATION forming part of Letters Patent No. 485,350, dated November 1, 1892.

Application filed August 30, 1892. Serial No. 444,505. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER P. MORROW, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Crank Arms and Shafts, of which the following is a specification.

The object of my said invention is to provide an improved means of uniting a crank arm to a shaft, which shall be both inexpensive to manufacture and secure in its operation.

Said invention will be first fully described, and then pointed out in the claims.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a front elevation of a crank arm and shaft embodying my said invention as applied to a bicycle-pedal; Fig. 2, a similar view of a fragment of the arm and shaft separately on an enlarged scale; Fig. 3, a sectional view on the dotted line 3 3 in Fig. 2; and Figs. 4 and 5, sectional views on the dotted lines 4 4 and 5 5, respectively, in Fig. 3.

In said drawings the portions marked A represent the crank-shaft, B the crank-arm, and C a bolt by which the two are clamped together.

The shaft A is an ordinary shaft, except that it has an eccentrically-set projection *a* on its end, behind which is preferably a transverse groove for the bolt.

The crank-arm B is slitted where it passes over the crank-shaft and is bored to fit the form of crank-shaft just described—that is, a socket is bored therein to receive the end of the shaft and a hole smaller in diameter than the socket is continued through to receive the eccentric projection. Another hole is bored transversely of these holes to receive the bolt, and this last-mentioned hole should intersect the boundary-line of the shaft hole or socket.

The bolt C is an ordinary bolt and passes through the hole in the end of the crank-arm, and one side of said bolt also fits into the groove formed to receive it in the crank-shaft.

The operation is as follows: The crank-arm is placed on the crank-shaft, as shown. This

is permitted to be easily done by the slitted form of the arm. The bolt is then passed through its hole and tightened up, which draws the two sides of the crank-arm toward each other, clamping them tightly onto the shaft, and also by means of the groove in said shaft serves as a pin, which holds it on and to position. The eccentric projection prevents any possibility of one part turning on the other. By means of this construction the whole device is enabled to be made by turning and boring and requires no square or flat fitting or the forming of any keyways, while at the same time the parts are attached together with more than usual security.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a crank-shaft having an eccentric projection and a crank-arm having a socket to receive the end of the shaft and a deeper socket or hole to receive said projection.

2. The combination of a crank-shaft having an eccentric projection and a crank-arm slitted at the end and provided with a socket for the end of the shaft and a deeper socket or hole for said projection and a bolt whereby the two parts of the arm may be clamped tightly onto the shaft.

3. The combination of the crank-shaft having a transverse groove, the crank-arm slitted at the end and provided with a socket or hole to receive the shaft, and a hole transversely thereof and intersecting said socket or hole to receive a connecting-bolt, a groove in the shaft corresponding to said transverse hole, and a bolt passing through the same, which thus serves both as a pin to prevent longitudinal movement and as a clamp-bolt to clamp the arm firmly onto the shaft, substantially as set forth.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 23d day of August, A. D. 1892.

ALEXANDER P. MORROW. [L. S.]

Witnesses:

H. H. FULTON,
CHESTER BRADFORD.