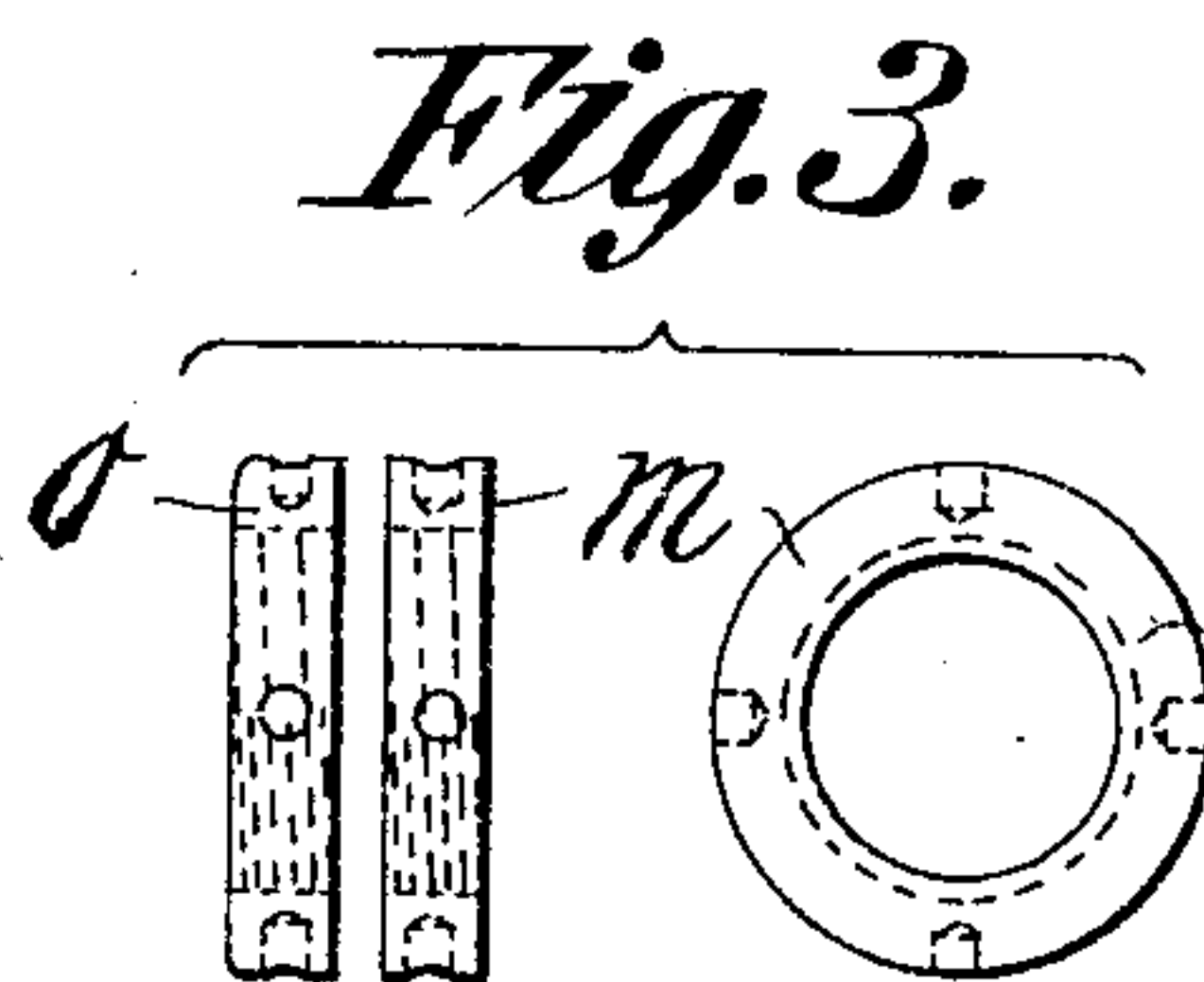
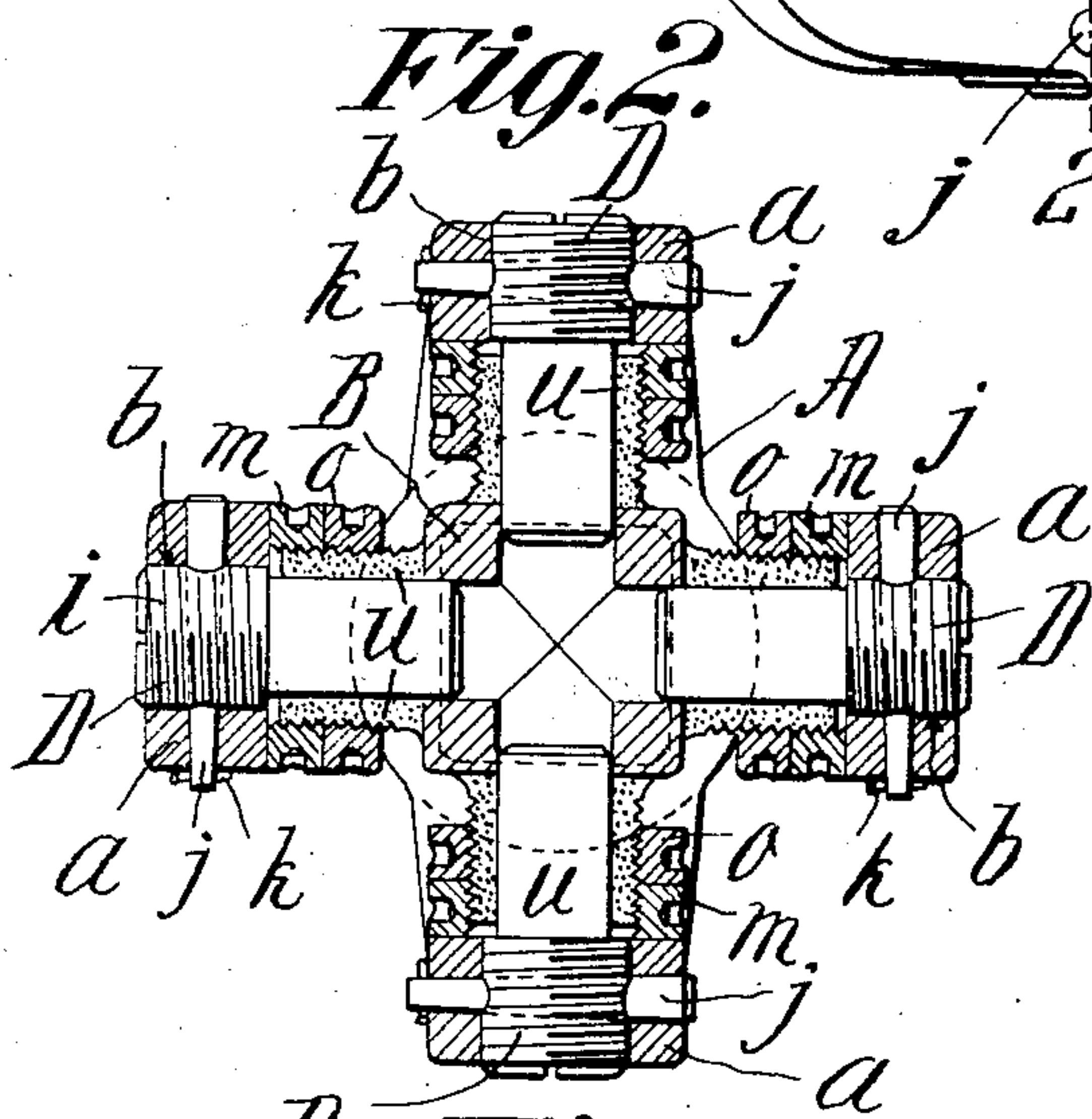
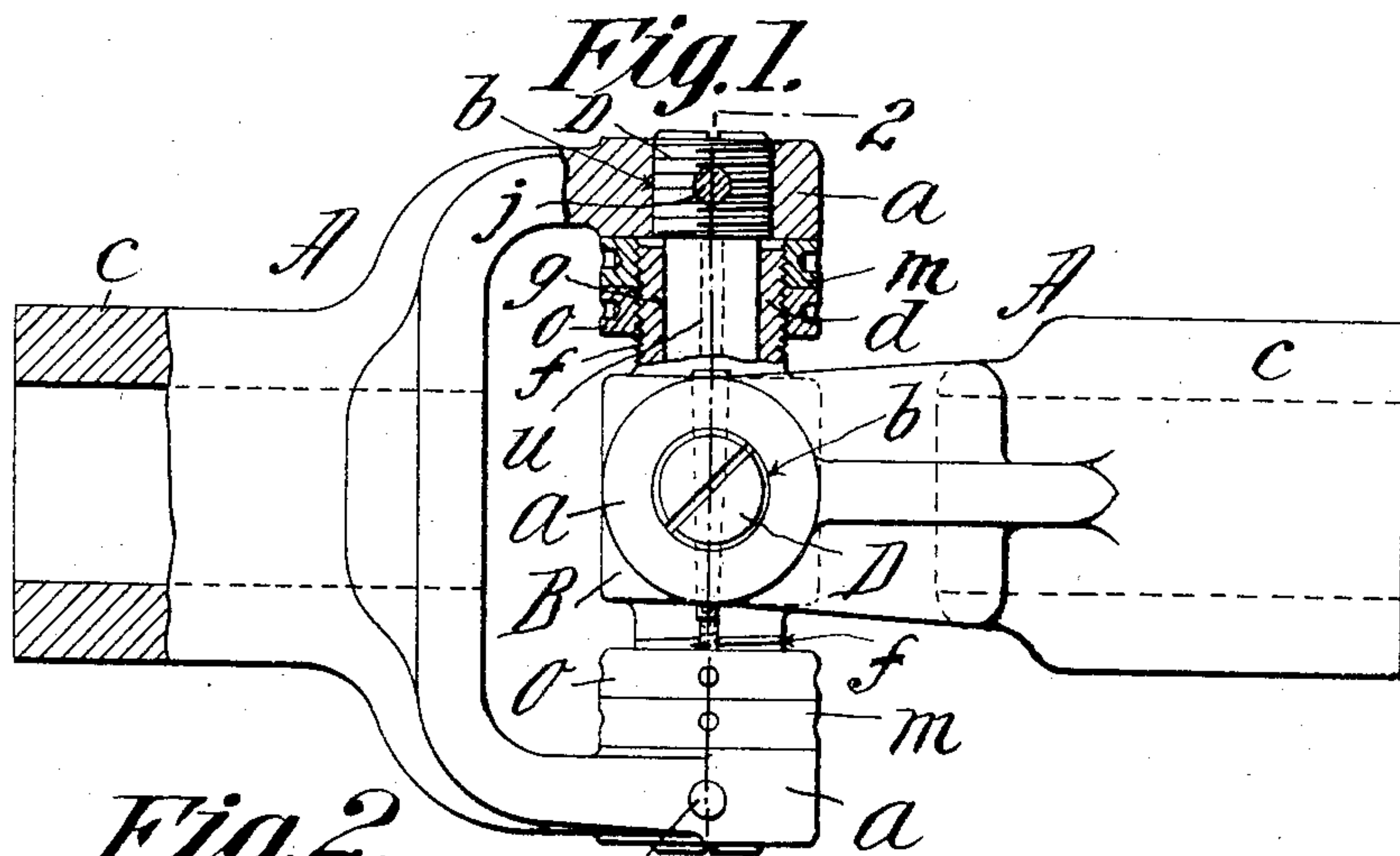
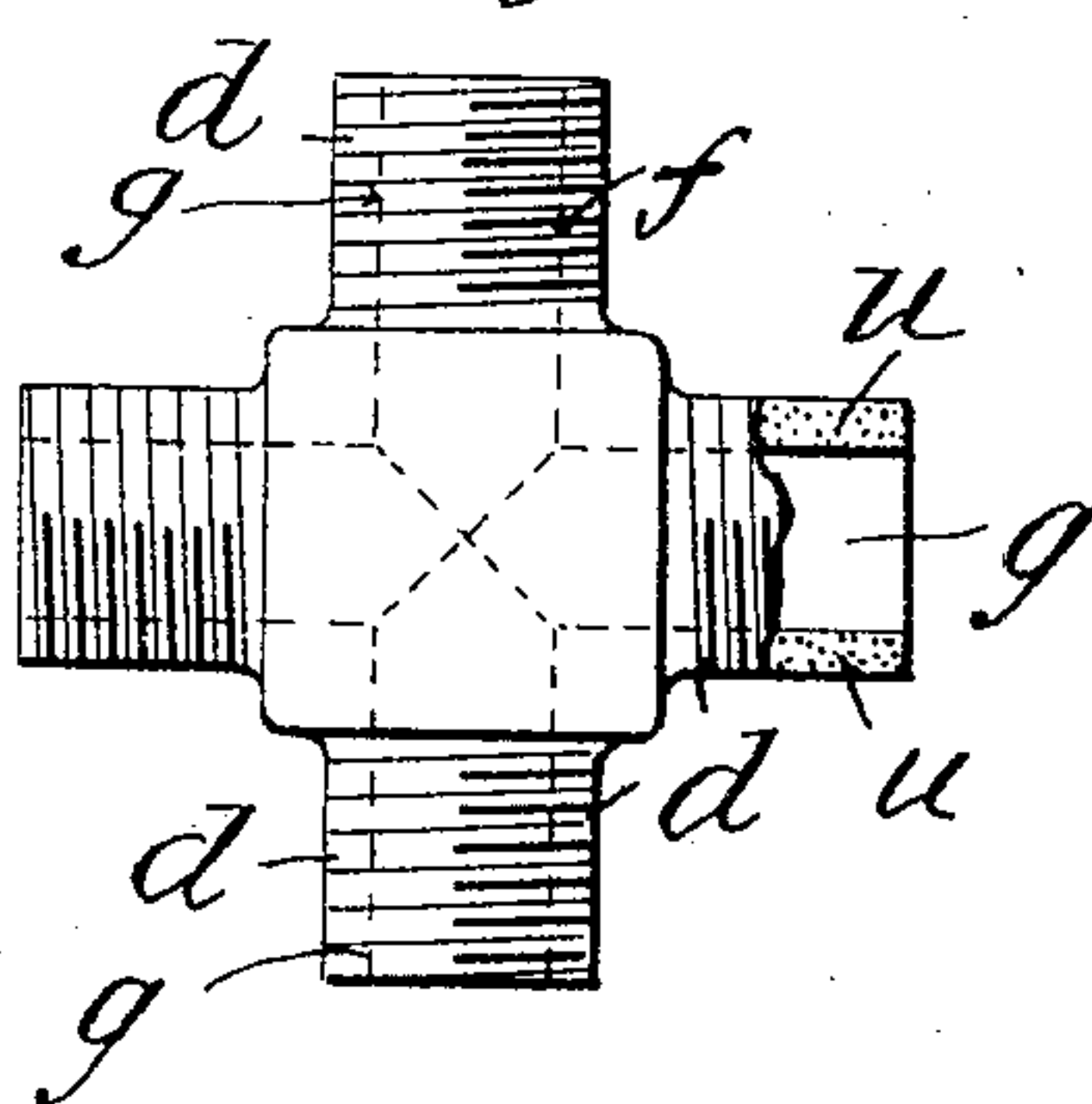


F. E. BOCORSELSKI.  
UNIVERSAL JOINT.

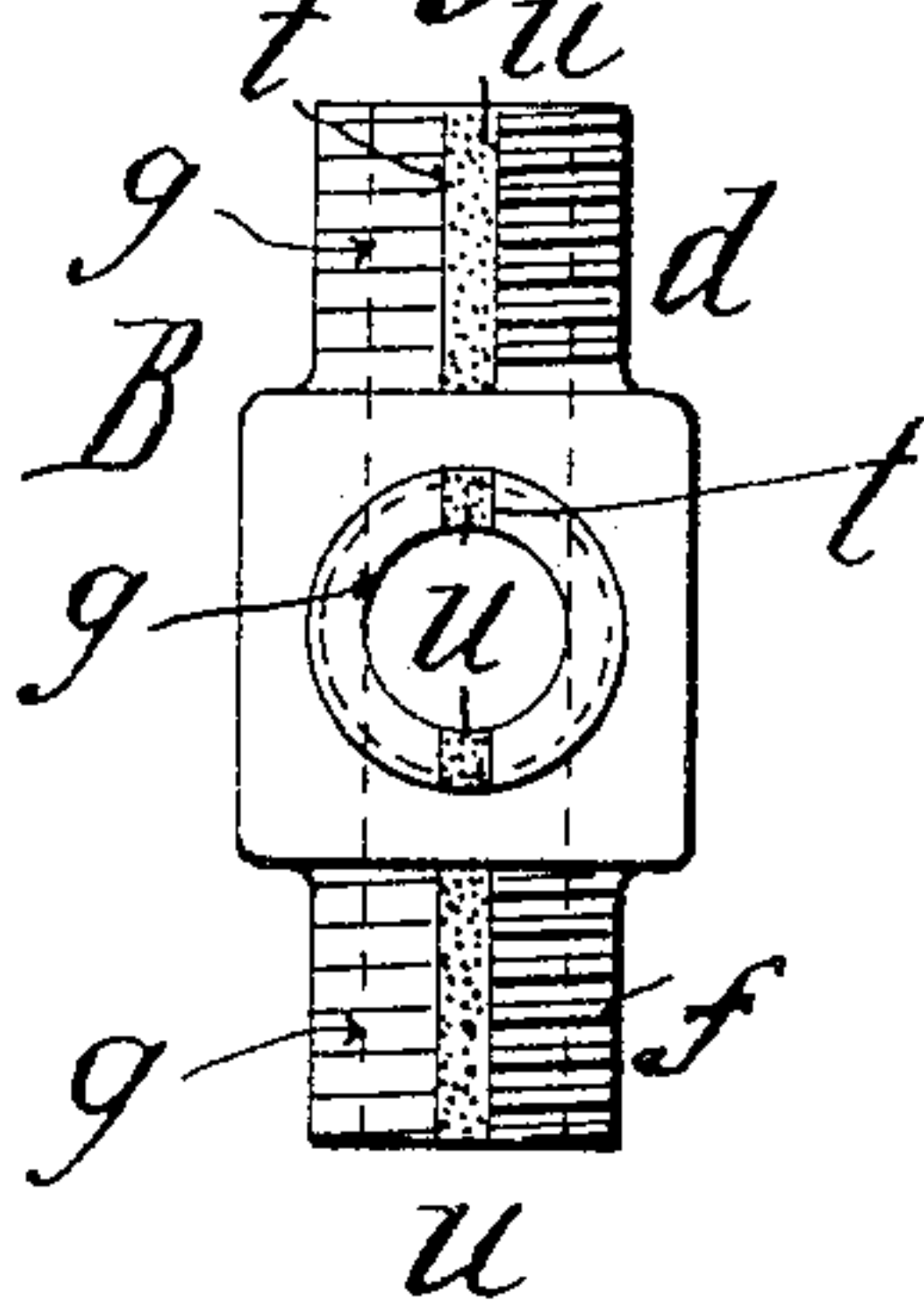
APPLICATION FILED OCT. 1, 1904.



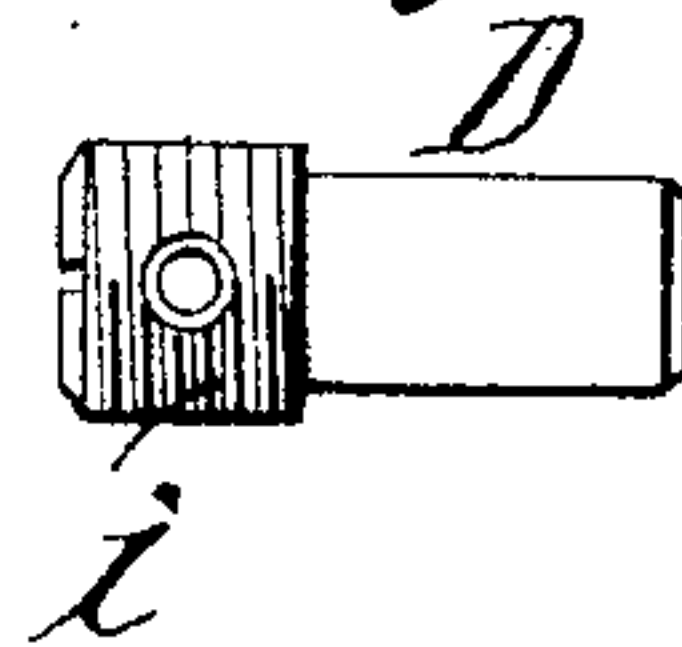
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

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## UNIVERSAL JOINT.

SPECIFICATION forming part of Letters Patent No. 779,903, dated January 10, 1905.

Application filed October 1, 1904. Serial No. 226,748.

*To all whom it may concern:*

Be it known that I, FRANK E. BOCORSELSKI, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Universal Joints, of which the following is a full, clear, and exact description.

This invention relates to improvements in universal joints of the very common class which comprises endwise-opposite forks having their pairs of jaws arranged in longitudinal planes which intersect each other at right angles and which are articulated to a central member or transmission-block.

The object of the invention is to so construct and combine the parts of the joint as to render not only possible but very quick and easy the adjustment of either or both of the fork members transversely of their axis and relatively to the transmission-block for the most suitable alinement of the fork members with respect to the transmission-shafts in connection with which the joint is combined.

The improvements are especially applicable for universal joints to be used as a part of the transmission connections or mechanism in automobiles, although available otherwise.

The invention consists in a universal joint having a fork member thereof combined with a central member or transmission-block provided with axially-alined oppositely-extending externally-screw-threaded trunnions having the distance between their ends less than the width of the space between the fork-jaws and having endwise-open sockets, studs engaged through the fork-jaws and protruding into the trunnion-sockets, with capability of play between the studs and socketed trunnions, and nuts screw-threading on the trunnions and setting against the inner faces of the fork-jaws.

The invention, furthermore, consists in further features, specific combinations, and arrangements and details of construction of certain of the parts, all substantially as fully described and set forth in the claims.

The improved universal joint is fully and

clearly illustrated in the accompanying drawings, in which—

Figure 1 is a side view with portions shown in central section. Fig. 2 is a cross-section on line 2 2, Fig. 1. Figs. 3, 4, 5, and 6 are side views, in detail, of parts of the joint to be hereinafter particularly referred to.

Similar characters of reference indicate corresponding parts in all of the views.

In the drawings, A A represent the two fork members of the joint, each having a pair of jaws *a a*, the inner faces of which are flat and parallel with each other, and the fork members are arranged, as usual, with their central median planes intersecting each other at right angles. The pairs of jaws for the forks are constructed with the alined round holes *b b* through them, which are internally screw-threaded and which extend at right angles to the axis of the shank *c* of the fork member A.

B represents the central member or transmission-block of the joint, having the opposite pairs of trunnions *d*, both trunnions of one pair being axially alined, one alined pair arranged at right angles to the other alined pair, and all of the trunnions are externally screw-threaded, as indicated at *f*, and all of the trunnions are provided with axial endwise-opening sockets *g*. The distance between the ends of the pairs of trunnions is less than the width of the spaces between the inner faces of the respective pairs of the jaws, as represented in the drawings.

D D represent studs having their enlarged outer end or head portion *i* screw-threaded and screw-engaged in the round holes *b* in the fork-jaws, while the inner extremities of said studs, which are preferably round in cross-section and of reduced diameter, protrude inwardly for a proper swivel-bearing fit in the sockets *g* in the trunnions of the central member.

*j j* represent locking-pins transversely penetrating the fork-jaws and the portions of the aforesaid studs D, which are screw-engaged therein, the outwardly-protruding smaller ends of the locking-pins *j*, which pins are shown tapered, having cotter-pins *k*, prefer-



ably split spring-pins, which increase the certainty of confinement of the locking means for the studs.

*m m* represent ring-nuts screw-threading on the outer end portions of the trunnions and arranged to be turned and set against the inner faces of the respectively adjacent fork-jaws. The nuts *m m* may be appropriately termed "adjusting-nuts," while the similar ring-nuts *o o*, screw-threading on the trunnions next to and inside of the adjusting-nuts, are jam or locking nuts to be set against the inner faces of the adjusting-nuts for locking the latter in their adjustments. In case one of the fork members does not in any situation aline as may be desired with the other fork member or with any transmission-shaft in conjunction with which this universal joint is employed the proper adjustments of either fork bodily transversely in relation to the transmission-block or central member and in relation to the axis of the relatively opposite fork member may be easily accomplished by the manipulation of the nuts for the proper pair of the trunnions, one pair *o m* of the nuts being positioned farther inwardly on the one trunnion, while the other pair of nuts *o m* are positioned outwardly on the other trunnion of the alined pair of trunnions.

Capability of lubrication of the parts having bearings for free swiveling motions in the joint—that is, the cylindrical inner portions of the studs *D* and the surrounding walls of the cylindrical sockets *g*—is provided for in a simple and satisfactory manner by making recesses in or apertures through the trunnions, communicating with the walls of the socket *g*, and advantageously, as represented at *t* in the drawings, inserting with a tight fit or suitable degree of binding sections or blocks *u*, of absorbent material—such, for instance, as felt—which are or may be saturated with oil. The oil taken from the section of felt onto the dowel or stud effectually lubricates the latter and the socket-wall in which it fits.

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

1. In a universal joint a fork member and the central member provided with axially-alined, oppositely-extending, externally-screw-threaded trunnions, having the distance between their ends less than the width of the space between the fork-jaws, and having endwise-open sockets, studs engaged through the fork-jaws and protruding into the trunnion-sockets, and nuts, screw-threading on the trunnions and setting against the inner faces of the fork-jaws.

2. In a universal joint, a fork member having in its jaws the alined screw-threaded openings, and the central member provided with alined, externally-screw-threaded trunnions, having the distance between their ends less

than the width of the space between the fork jaws, and having endwise-open sockets, studs having their outer end portions threaded and screw-engaged through the threaded openings in the fork-jaws, and having their inner extremities protruding into the trunnion-sockets, and nuts, screw-threading on the trunnions, and setting against the inner faces of the fork-jaws.

3. In a universal joint, a fork member, and the central member provided with alined externally-screw-threaded trunnions, having the distance between their ends less than the width of the space between the fork-jaws, having endwise-open sockets, and constructed with apertures intersecting the said sockets, studs engaged through the fork-jaws and protruding into the trunnion-sockets, sections of absorbent lubricant-carrying material engaged in said apertures, and nuts, screw-threading on the trunnions, and setting against the inner faces of the fork-jaws.

4. In a universal joint, a fork member and the central member provided with alined externally-screw-threaded trunnions, having the distance between their ends less than the width of the space between the fork-jaws, and having endwise-open sockets, studs engaged through the fork-jaws and protruding into the trunnion-sockets, locking-pins passing transversely through the fork-jaws and the outer end portions of said studs, and nuts, screw-threading on the trunnions, and setting against the inner faces of the fork-jaws.

5. In a universal joint, a fork member and the central member provided with alined externally-screw-threaded trunnions, having the distance between their ends less than the width of the space between the fork-jaws, and having endwise-open sockets, studs engaged through the fork-jaws and protruding into the trunnion-sockets, adjusting-nuts screw-threading on the trunnions and setting against the inner faces of the fork-jaws, and locking-nuts also screw-threading on the trunnions and setting against the inner faces of the locking-nuts.

6. In a universal joint, the pair of fork members, and the central member provided with two pairs of externally-screw-threaded axially-alined trunnions, one pair being arranged at right angles to the other, having the distances between their ends less than the widths of the spaces between the respective pairs of fork-jaws, and all having endwise-open sockets, studs engaged through the fork-jaws and protruding into the trunnion-sockets and nuts screw-threading on the trunnions and setting against the inner faces of the fork-pairs.

Signed by me at Springfield, Massachusetts, in presence of two subscribing witnesses.

FRANK E. BOCORSELSKI.

Witnesses:

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G. R. DRISCOLL.