

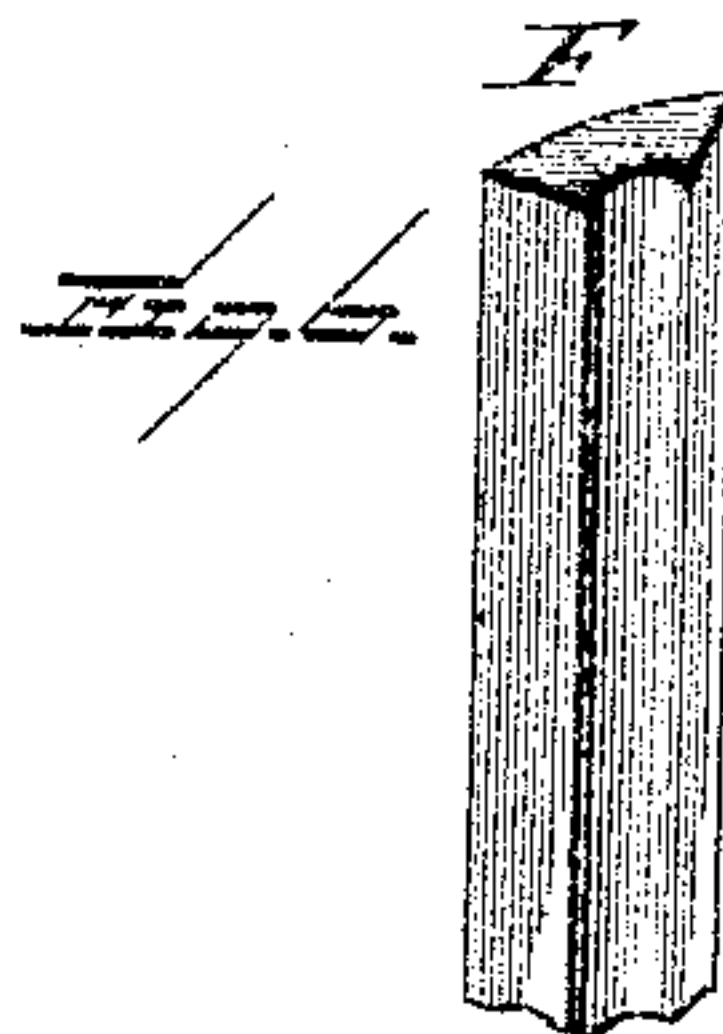
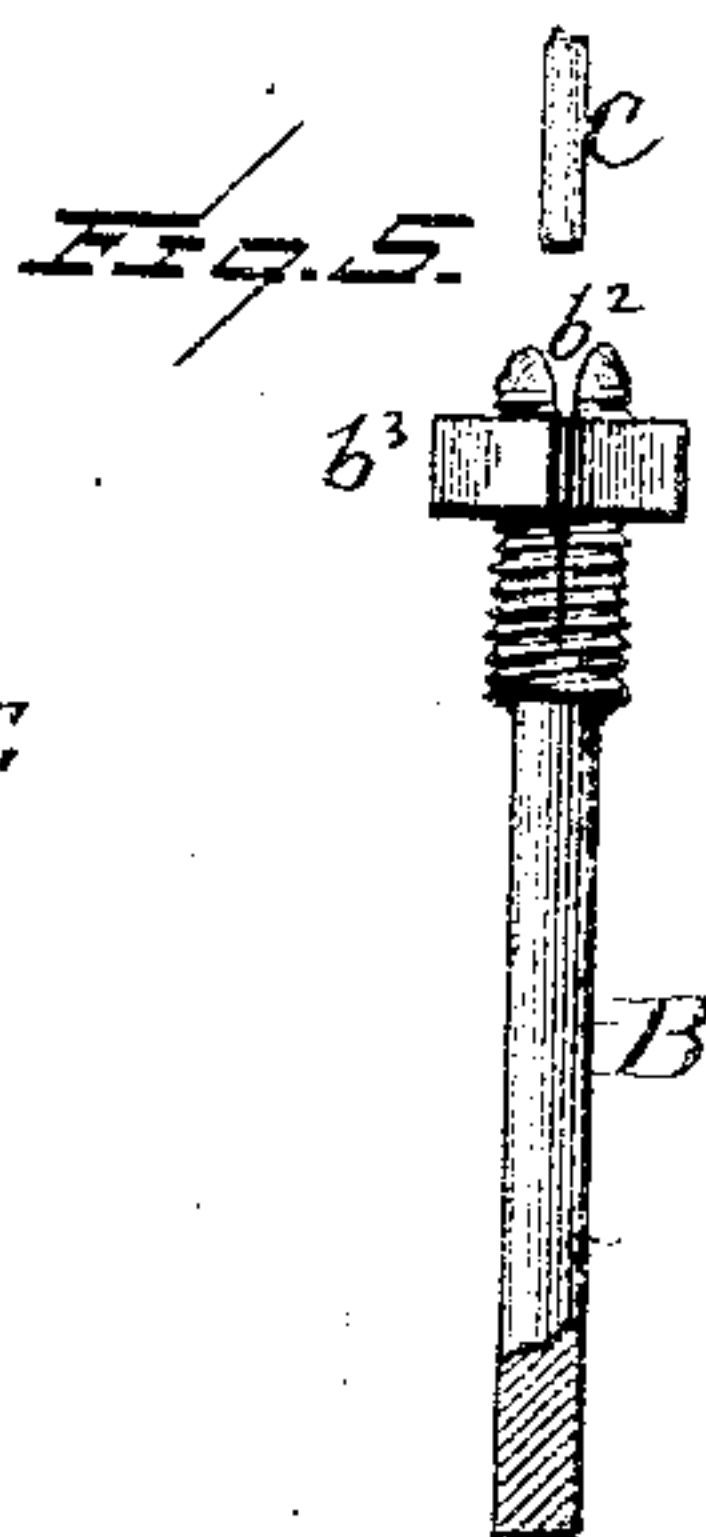
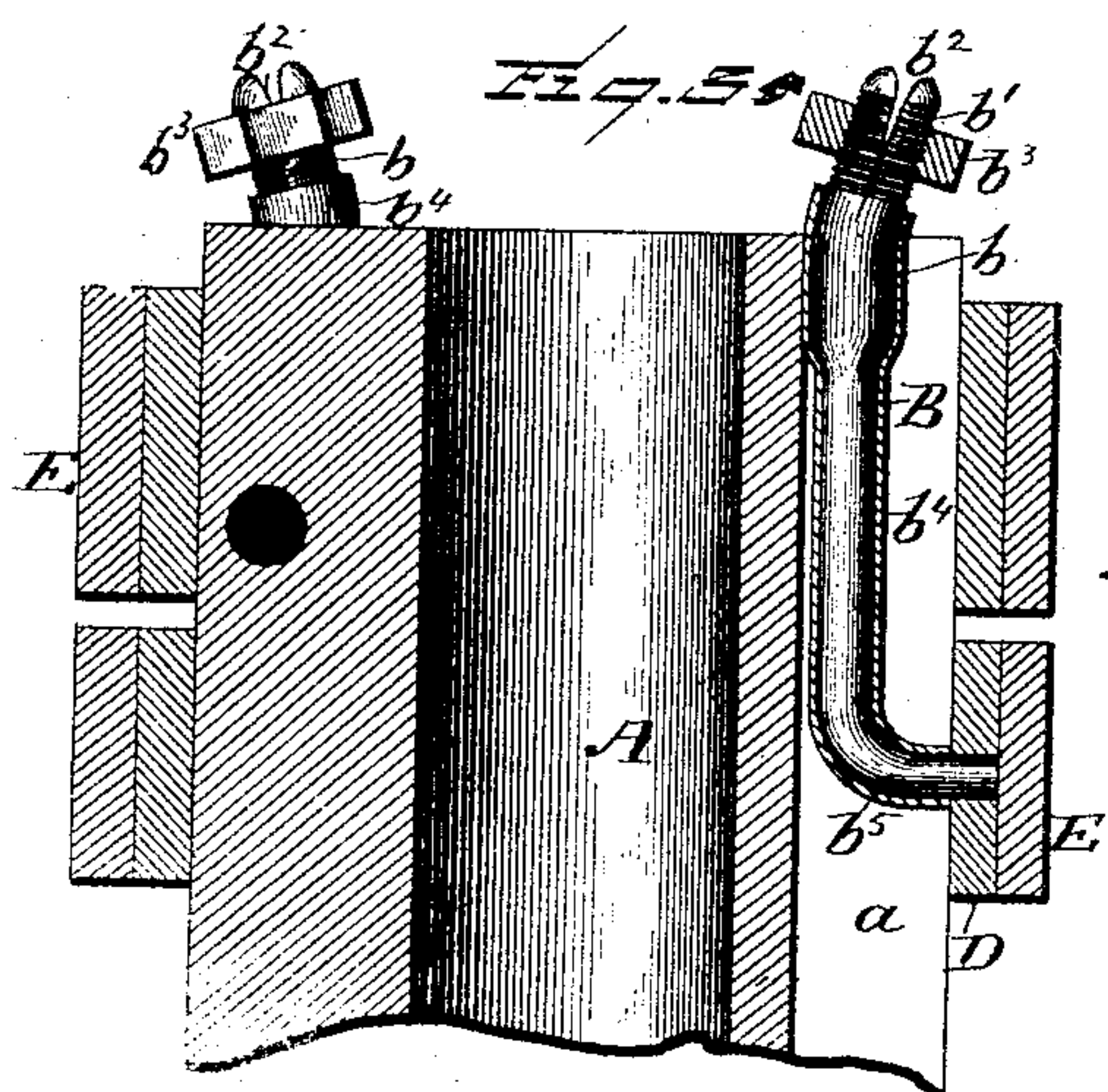
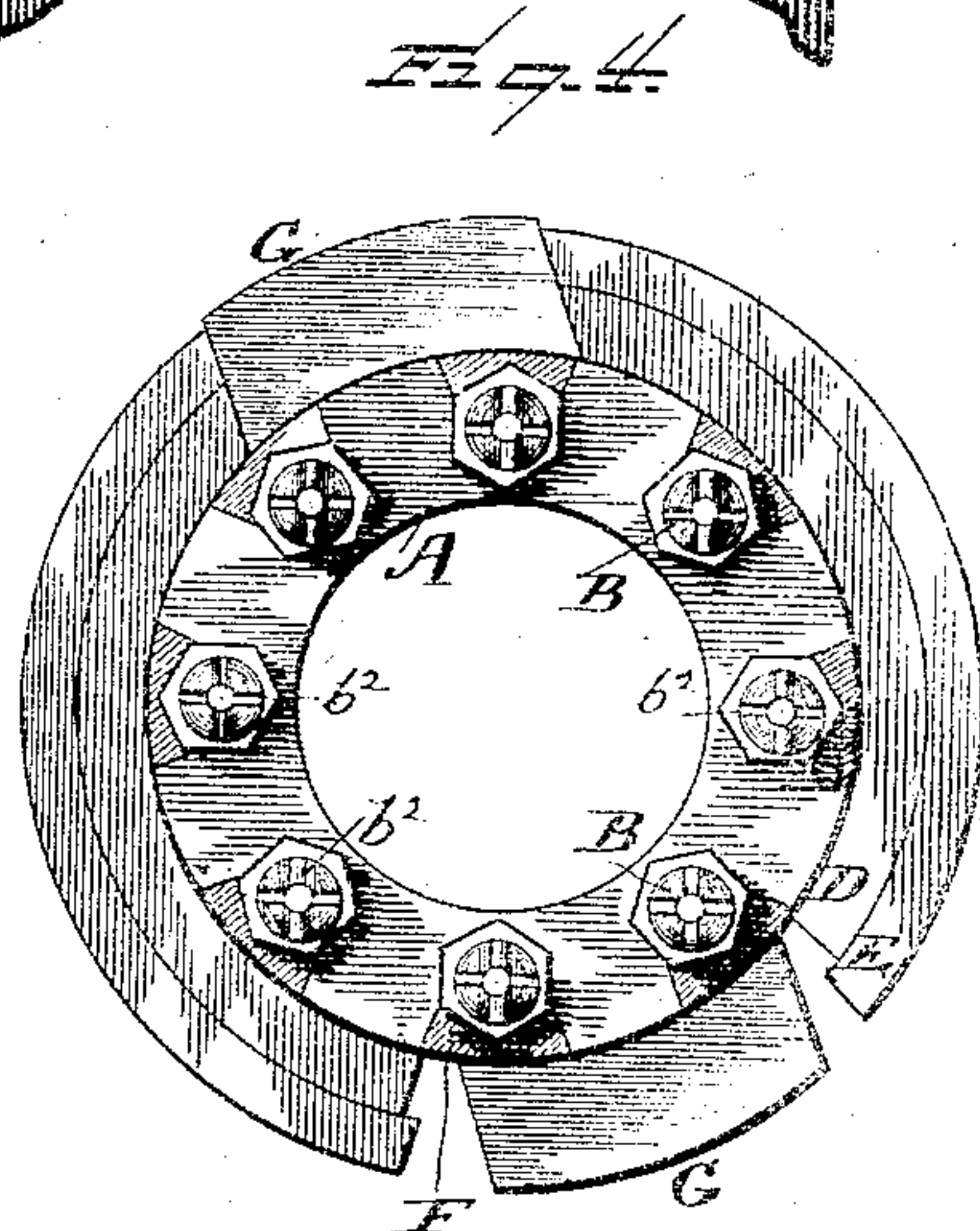
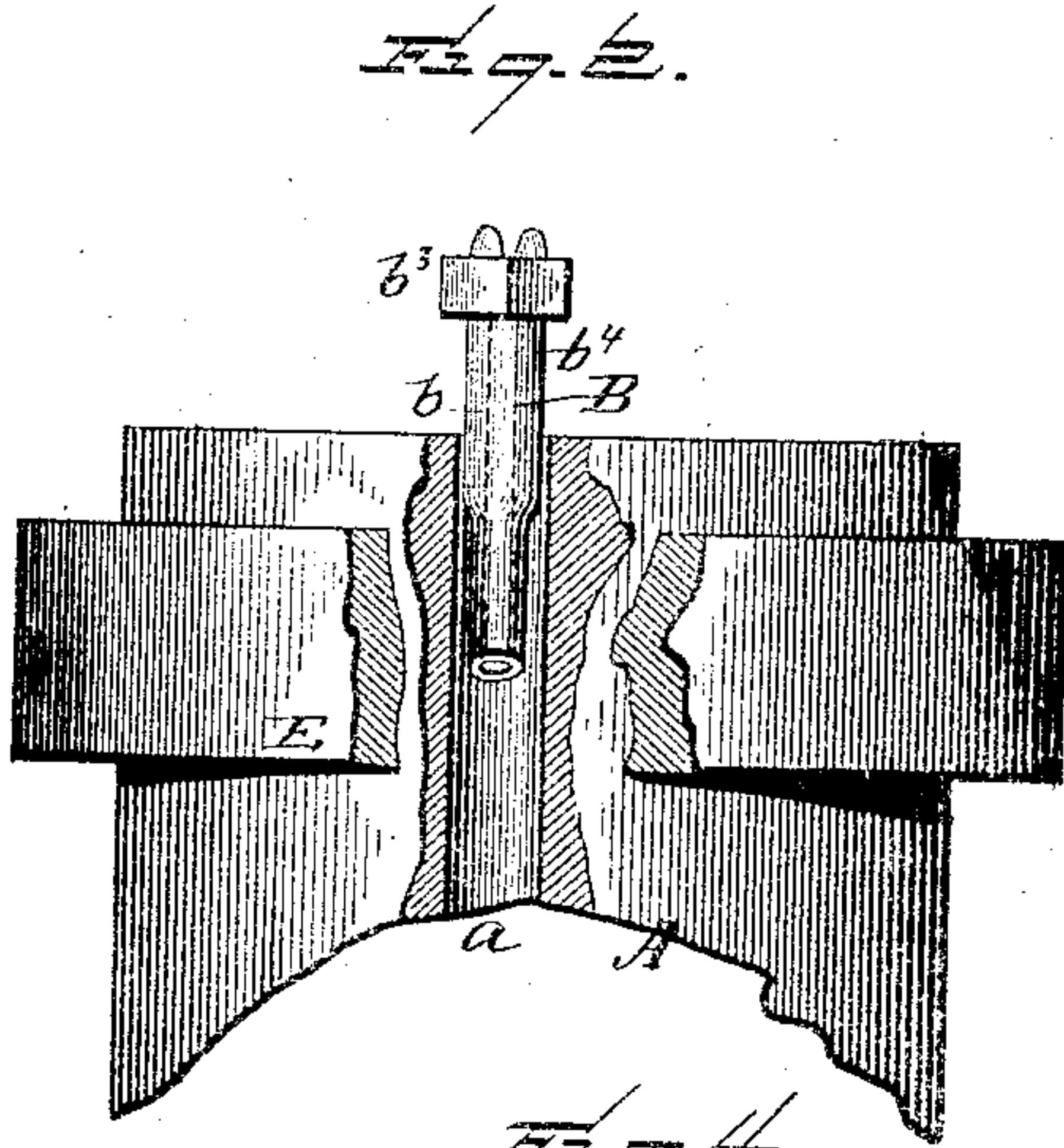
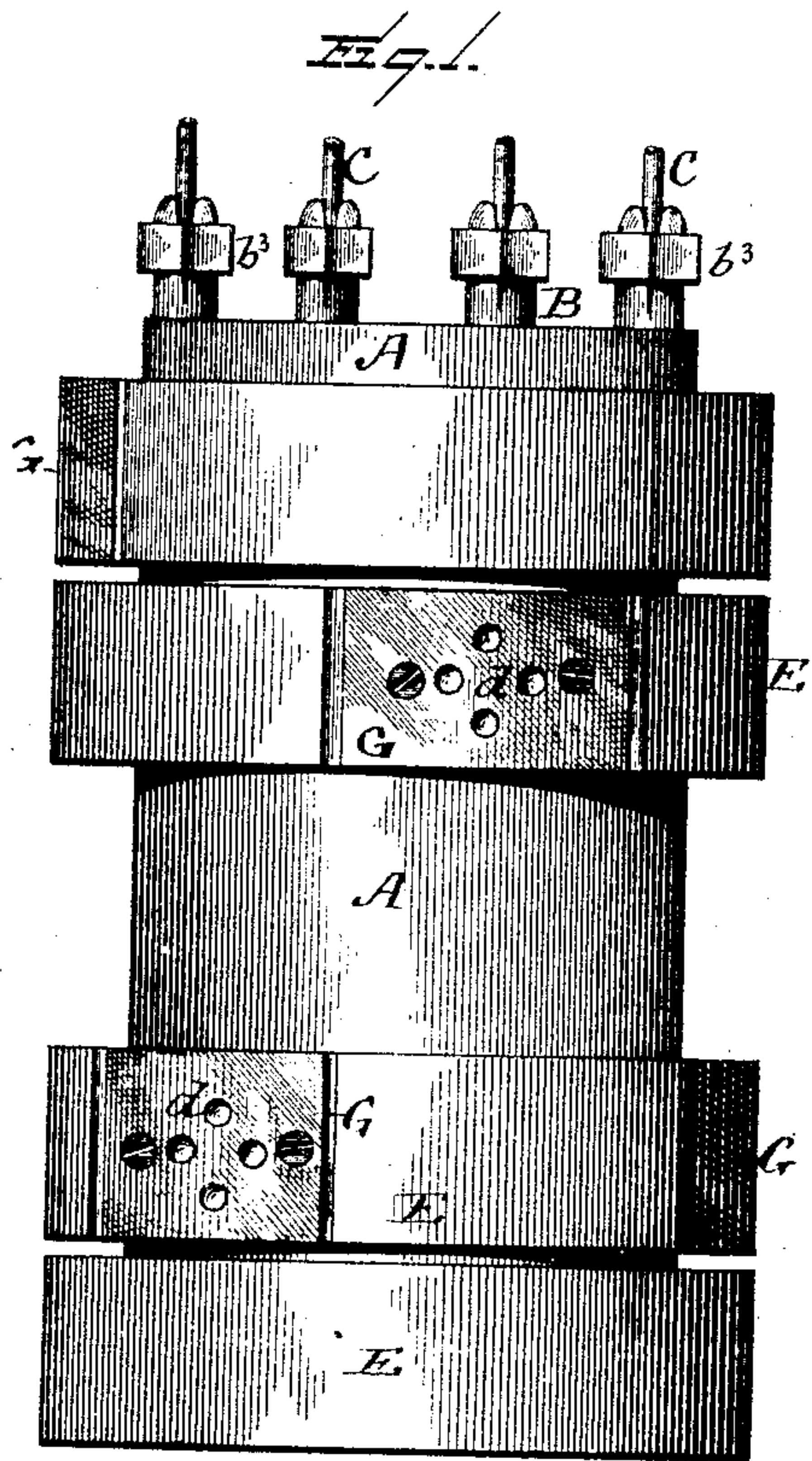
(No Model.)

F. B. MITCHELL.

COMMUTATOR FOR DYNAMO ELECTRIC MACHINES.

No. 385,943.

Patented July 10, 1888.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

FRANK B. MITCHELL, OF COLUMBUS, OHIO.

## COMMUTATOR FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 385,943, dated July 10, 1888.

Application filed July 15, 1887. Serial No. 244,373. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK B. MITCHELL, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Commutators for Electric Dynamo-Machines, of which the following is a specification.

My invention relates particularly to that kind of commutator in which the segments are so arranged that the several bobbins of the armature to which they are connected are cut out of electrical connections with the remainder of the circuit during a portion of each revolution.

The object of my invention is to greatly reduce the weight and cost of the commutator and increase its insulating and its circuit making and breaking efficiency, and provide means which greatly facilitate mounting all or any of the parts and connecting them to the armature-wires.

The improvement consists, mainly, in constructing the hub of the commutator of hard wood with insulating segments and conducting-segments secured thereto, in making the insulating-segments of glass, in covering the conducting-wires with a non-conducting tubing and securing them in grooves or pockets formed in the hub, and in providing the conducting-wires with an enlarged head and clamp, and connecting the inner end of said conducting-wire with a conducting-plate of the armature, and clamping the outer end of the said conducting-wire with the armature-wire, as will hereinafter appear.

In the accompanying drawings, Figure 1 is a side elevation of my improved commutator; Fig. 2, an elevation of the commutator broken away to show one of the connecting-wires in elevation; Fig. 3, a sectional elevation of the parts shown in Fig. 2; Fig. 4, an end elevation of the commutator; Fig. 5, an elevation, partly in section, of the conducting-wires; and Fig. 6 a perspective of one of the filling strips.

The commutator-core A is fitted upon the shaft of an electrical machine in any well-known or preferred manner, and consists of a cylindrical block of hard wood having its periphery longitudinally grooved at *a* to receive the conducting-wires B, which are preferably

of copper with an enlarged head, *b*, screw-threaded at *b'* and split in four quarters at *b''* to receive the armature-wire C. A nut, *b'''*, is fitted upon the screw threaded portions *b'* of the conducting-wire and serves to clamp the jaws of the conducting-wire upon the armature-wire. The conducting-wire is covered with an insulating-jacket, *b<sup>4</sup>*, of suitable non-conducting material, and has an elbow, *b<sup>5</sup>*, at its inner end, which passes through an inner ring, D, and is securely united to or terminates against an outer segment, E, of copper, over which the brushes of the electrical machine pass to complete the circuit through the said conducting-wires and armature-wires. Filling-strips F, that may be dovetailed, are fitted over the conducting-wires B and grooves *a* in the core A, and are held in place by the inner rings, D, which surround the core.

The cutting-out or insulating segments G of the commutator are made of glass secured to the core A, and are diagonally grooved in a well known manner, or have small cavities *d* to receive oil to prevent cutting between the contact-brushes and the insulating segments and for the dispersion of heat.

The commutator constructed, as above described, with a wooden core, is found in practice to work better than a commutator made mainly of metal, the principal advantages possessed by wood being its insulating properties and its lightness.

The insulating-segments G of the commutator being made of glass are light and extremely hard and are not liable to be grooved by the commutator-brushes, and as glass is a non-conductor of heat and possesses a remarkably smooth surface the said segment-blocks will not become heated nor tend to heat the brushes by contact with them.

The conducting-rods B may be easily removed from the grooves and replaced therein, and being both covered with a non-conducting jacket and embedded in non-conducting material are not liable to burn out or carry off the currents through irregular channels.

The commutator may be constructed at small cost, and being light is easily handled, and should any of its connections become impaired or severed they may be quickly and readily re-



paired and its insulations examined and kept perfect.

Although the core A above mentioned is described as formed of wood, the entire core may be formed of glass, in which case the glass may be blown about the wires and the glass segments above referred to formed with the core.

I claim as my invention and desire to secure by Letters Patent—

10 1. In a commutator for electrical machines, the combination of the wooden core A, having segments removed therefrom, the conductors B, and the filling-strips F, the inner ring, D, the conducting segments E upon said rings, and  
15 the insulating segments having cavities *d* therein, substantially as and for the purpose described.

2. In a commutator, the combination, with

the core A, having grooves *a* and the conducting and insulating plates, of the conducting- 20 rods B, fitted within said grooves, and filling-strips F, adapted to cover said grooves and rods, substantially as described.

3. In a commutator, the combination, with the core A, grooved at *a*, of the conducting-rod 25 B, having a clamping outer end and an elbow upon its inner end and a conducting-plate secured to said elbow, and a cylindrical insulating-jacket inclosing said elbow and rod, substantially as described, for the purpose specified. 30

FRANK B. MITCHELL.

Attest:

C. R. GILMORE,  
W. S. SHEPHERD.