

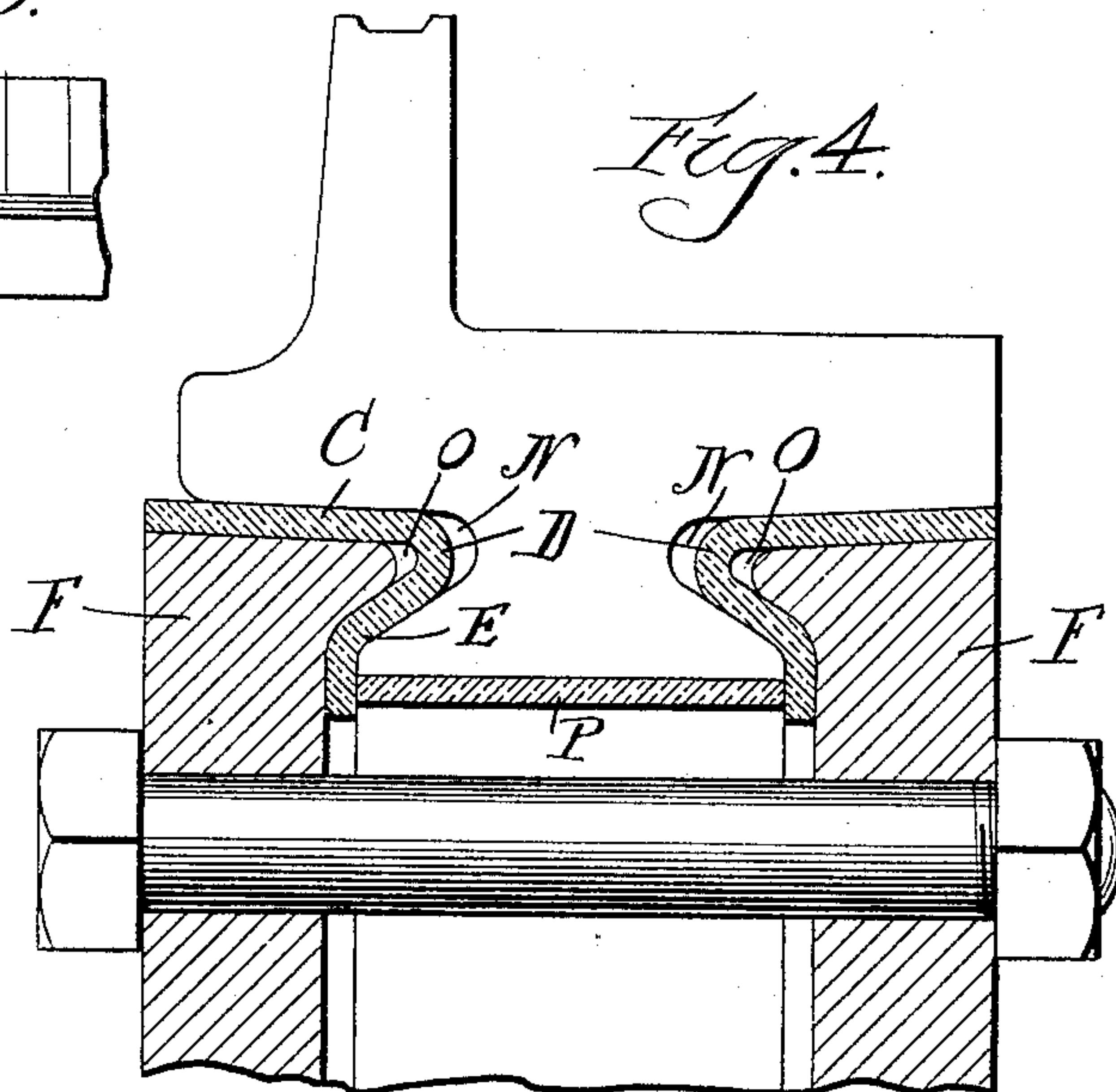
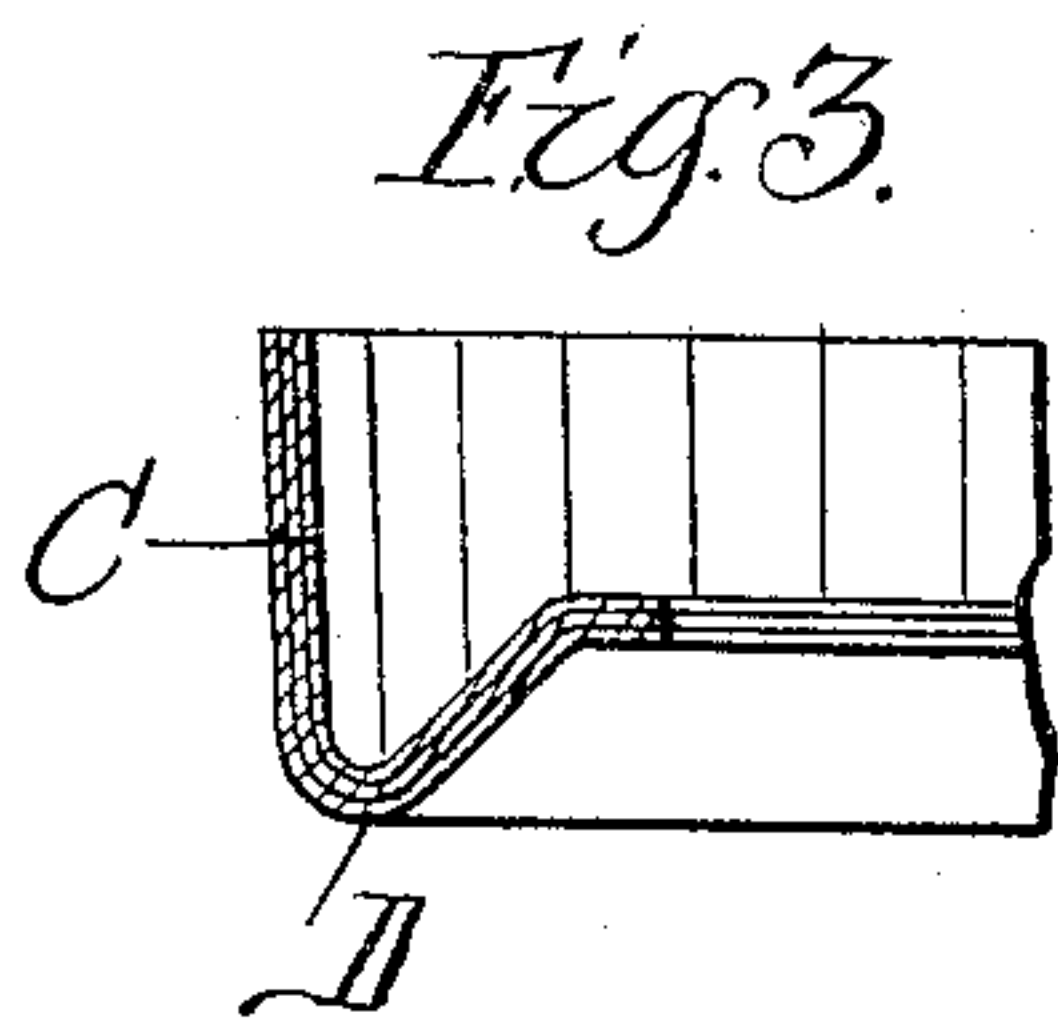
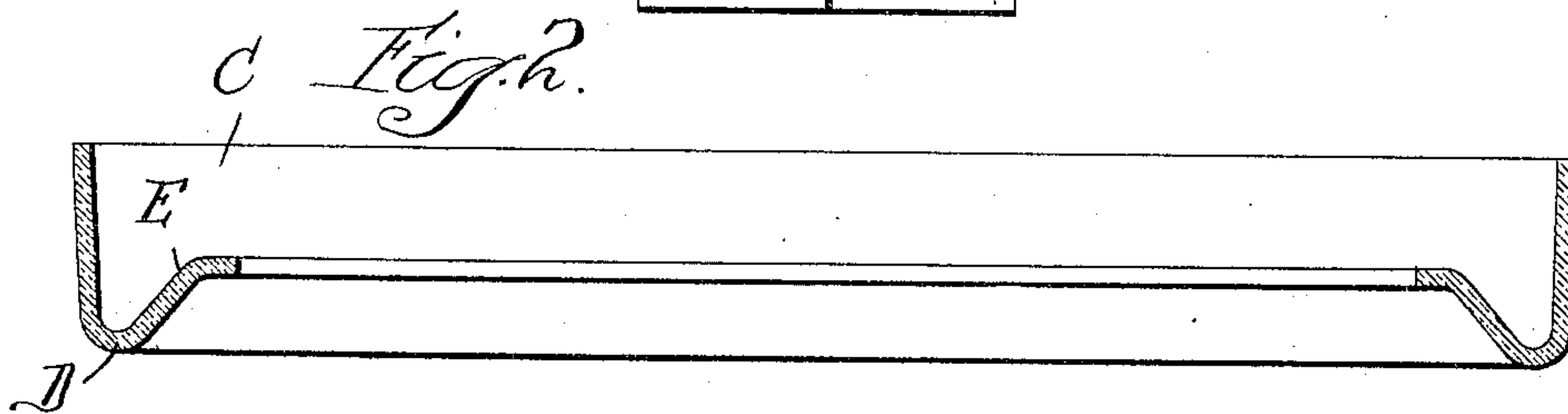
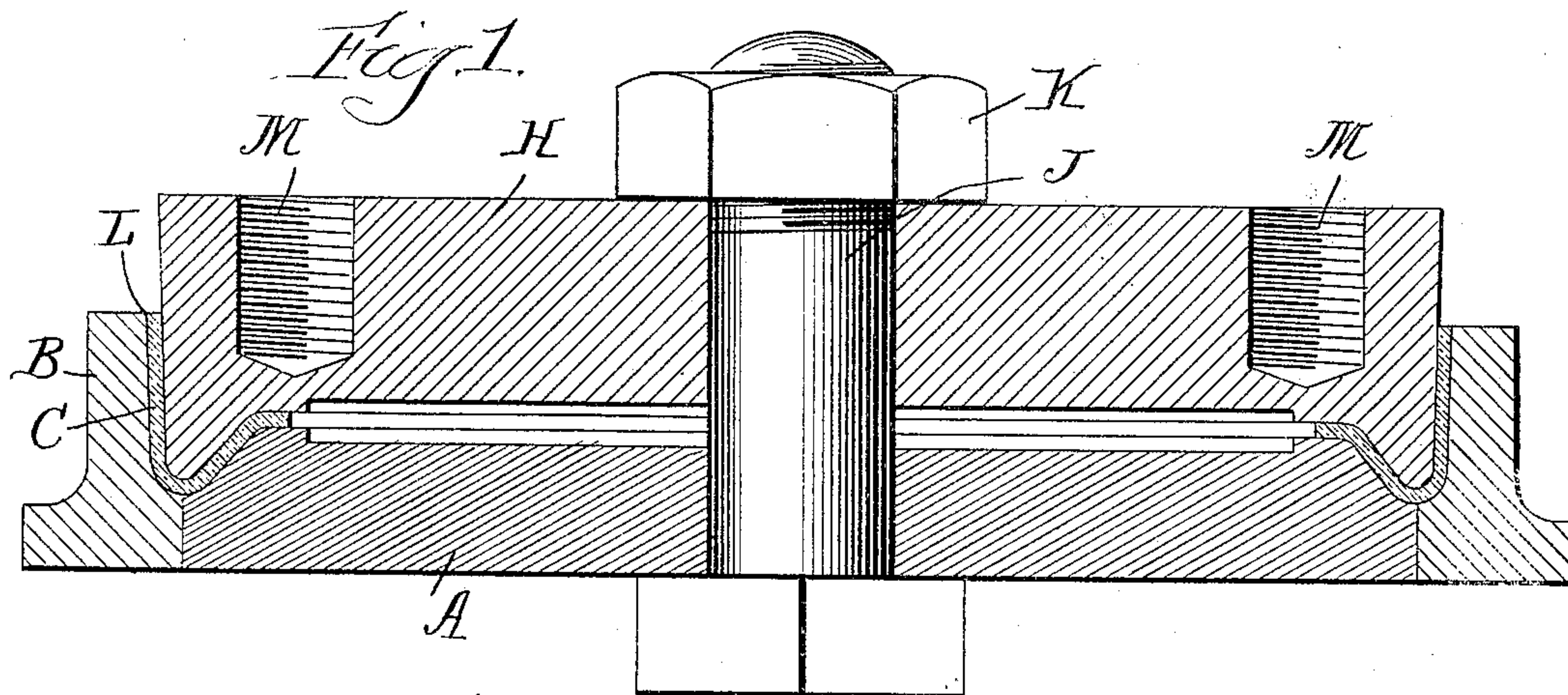
(No Model.)

S. H. SHORT.

CONSTRUCTION OF END RINGS FOR COMMUTATORS.

No. 593,283.

Patented Nov. 9, 1897.



Witnesses
Wm. J. Fleming
Wm. M. Rheum.

Inventor
Sidney H. Short
By Brown & Darby
Attys.

UNITED STATES PATENT OFFICE.

SIDNEY H. SHORT, OF CLEVELAND, OHIO.

CONSTRUCTION OF END RINGS FOR COMMUTATORS.

SPECIFICATION forming part of Letters Patent No. 593,283, dated November 9, 1897.

Application filed May 3, 1897. Serial No. 634,852. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY H. SHORT, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Construction of End Rings for Commutators, of which the following is a specification.

This invention relates to the construction of end rings for commutators.

The object of the invention is to provide a built-up end ring for commutators and to avoid joints and breaks therein.

The invention consists substantially in the construction, combination, location, and arrangement, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally specifically pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference-signs appearing thereon, Figure 1 is a view in central section of an apparatus for compressing and shaping the end ring in accordance with the principles of my invention. Fig. 2 is a transverse sectional view of an end ring constructed in accordance with my invention. Fig. 3 is an enlarged sectional view, partly broken away, illustrating the mode of operation in building up an end ring in accordance with my invention. Fig. 4 is a broken sectional view of a commutator, showing the application thereto of the insulating end ring embodying my invention.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

Heretofore it has been the custom to employ sheets of mica or other suitable insulating material for the end rings of commutators. Owing to the brittleness of mica, the best and most desirable material for the purpose, it has been exceedingly difficult to bend the sheets of mica to conform to the shape of the dovetails in the commutator-bars when assembled into ring form, the sheets of mica breaking at the bends thereof when the commutator-heads are clamped upon the ends of the commutator-ring. For this reason it has been customary to employ practically straight sheets of mica which are arranged to project flatwise, or substantially so, into the neck of the dovetail of the commutator-ring. This is objectionable for the reason that thereby a break

or joint results where the ends of the sheets of mica come together at the bottom of the dovetail grooves, thereby impairing the efficiency of the insulation.

It is the purpose of the present invention to produce a continuous end ring of insulating material which is formed into the desired shape and wherein breaks and joints are avoided. In order to accomplish these ends, I build up the end ring out of thin lamina of the insulating material—for instance, mica. In order to do so, I provide a suitable mold, comprising a plate A, having the desired configuration along one edge thereof, and I arrange said plate to fit snugly within an encircling ring B, said ring on the inner surface thereof being correspondingly grooved or shaped to receive the strips or thin laminations of mica or other insulating material, the configuration of the inner surface of said ring together with the shape and configuration of the edge of the plate A cooperating together to conform to the exterior shape of the end ring C when completed, the edge of the plate A being beveled and forming with the depression or groove in the ring B a depression conforming to the shape of the bend in the end ring, which bend is designed to occupy the base of the dovetail in the commutator-ring, as clearly indicated, while the beveled or curved edge of plate A is designed to conform to the shape of the portion of the end ring which follows the outline of the dovetail projection of the commutator-ring and receives the bearing of the heads F.

I have shown in Fig. 3 the manner of building up the end rings. The mica or other material is first split into very thin flexible laminations or sheets. These laminations are then placed in the mold A B, side by side all the way around in layers, the joints between adjacent strips of one layer being lapped by the strips or sheets of succeeding layers. By employing very thin strips or laminations of the mica or other insulation it is a very easy matter to bend each strip to conform to the shape of the bottom of the mold until finally the desired thickness is attained by adding successive layers of the thin strips.

Before beginning the operation of laying the strips in the mold, and in order to facilitate the removal of the ring when completed, I place a thin sheet of waxed paper over the

surface of the mold which is to receive the sheets or strips, and in order to secure a proper adherence of the strips and of the successive layers of strips to each other I may, if
 5 desired or necessary, apply a thin coat of varnish to the individual strips before arranging the same in the mold. When the desired thickness of ring has thus been built up, I introduce into the mold a clamping-plate H,
 10 having the required configuration or shape on the lower and outer peripheral edge and surface thereof to conform to the shape of the ring when completed. The outer or peripheral surface of this plate is made slightly
 15 conical in order to facilitate the withdrawal of the same when the operation is completed. Pressure is applied to force this plate solidly down against the built-up mica or insulating strips, thereby setting the same in the desired
 20 shape. This pressure may be applied in any suitable manner.

I have shown a headed bolt adapted to be passed through the plates A and H, and threaded to receive a nut K. By turning up
 25 on this nut the plate H may be clamped down upon the ring C with the required degree of pressure. In order to prevent the laminated insulating-ring C from adhering to the surface of the plate H, I may place a suitably oiled or
 30 waxed sheet of thin paper L over the built-up ring of laminations before inserting the plate H in the mold.

In order to expel any air that may be confined in the joints or spaces between the
 35 laminæ or sheets of mica, and also to vaporize and expel the varnish employed as a coating for the sheets or thin laminations, I subject the mold with the ring of mica strips clamped between the plates H and A to heat
 40 and gradually increase the clamping pressure by turning up on the nut K.

After the operation is completed and the ring is finished and has become set to the required shape the plate H is removed by re-
 45 moving the nut K and inserting suitable eye-bolts in the threaded sockets M and exerting a pull thereon. The plate or disk A and the encircling ring B are then separated, and the end ring C is ready for use.

50 In practice I prefer to so form the end ring C that the bend D therein, which fits into dovetail groove of the commutator-ring, will not bottom against the base of such groove, but when arranged in place a space (indicated
 55 at N, Fig. 4) will be left between the end ring and the base of such groove. I also form the engaging rim of the end plates F so that they will not bottom with the base of the groove or channel formed by the bend D in the end
 60 ring C, as indicated by the space O, and hence when the end rings F are clamped upon the dovetail projection of the commutator-ring, with the end ring C interposed, I avoid danger of breaking the end rings by unduly fore-
 65 ing the bends thereof into the dovetail groove or channel of the commutator-ring.

The end rings C are applied in use to the commutator-ring, as clearly shown in Fig. 4, the end rings being arranged in place and the heads F then clamped thereon. Usually a
 70 cylinder P of insulation is arranged over the inner surface of the commutator-ring.

Many variations in the details of construction and arrangement of parts would readily suggest themselves to persons skilled in the
 75 art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact details shown and described; but,

Having now set forth the object and nature
 80 of my invention and the manner of carrying the same into practice, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. A continuous end ring for commutators
 85 built up of strips of insulation, each strip successively shaped to conform to the commutator-bars, and the whole set to proper shape, as and for the purpose set forth.

2. An end ring for commutators built up of
 90 layers of strips of suitable insulation, each strip of each layer separately shaped to conform to the groove or channel of the commutator-bars, the whole compressed to retain the desired shape, as and for the purpose set forth. 95

3. An end ring for commutators built up of overlapping thin strips or laminations of insulating material, each strip being separately bent to the required shape and the whole compressed to retain the shape to which the strips
 100 are bent, as and for the purpose set forth.

4. An end ring for commutators built up of thin sheets or strips of insulating material, said sheets or strips being lap-jointed, and individually and separately bent to the re-
 105 quired shape, as and for the purpose set forth.

5. An end ring for commutators built up of successive layers of overlapping thin strips of insulating material, the individual strips being separately shaped to conform to the out-
 110 line of the commutator-bars, and means whereby said strips are set to the required shape, as and for the purpose set forth.

6. The combination of a commutator having a channel or groove, of a continuous inte-
 115 gral ring of insulating material shaped to conform to the outline of said groove, but not bottoming therewith, and heads for clamping said rings in place, as and for the purpose set forth.

7. The combination of a commutator hav-
 120 ing a channel or groove, of an end ring having a bend adapted to be received in but not bottoming with said groove or channel, and means for clamping said end ring in place, as and for the purpose set forth. 125

In witness whereof I have hereunto set my hand, this 29th day of April, 1897, in the presence of the subscribing witnesses.

SIDNEY H. SHORT.

Attest:

M. A. KENSINGER,
 JOHN J. BEVER.