

No. 686,941.

Patented Nov. 19, 1901.

W. S. JONES.
BONDING PLUG.

(Application filed Mar. 16, 1901.)

(No Model.)

Fig. 5.

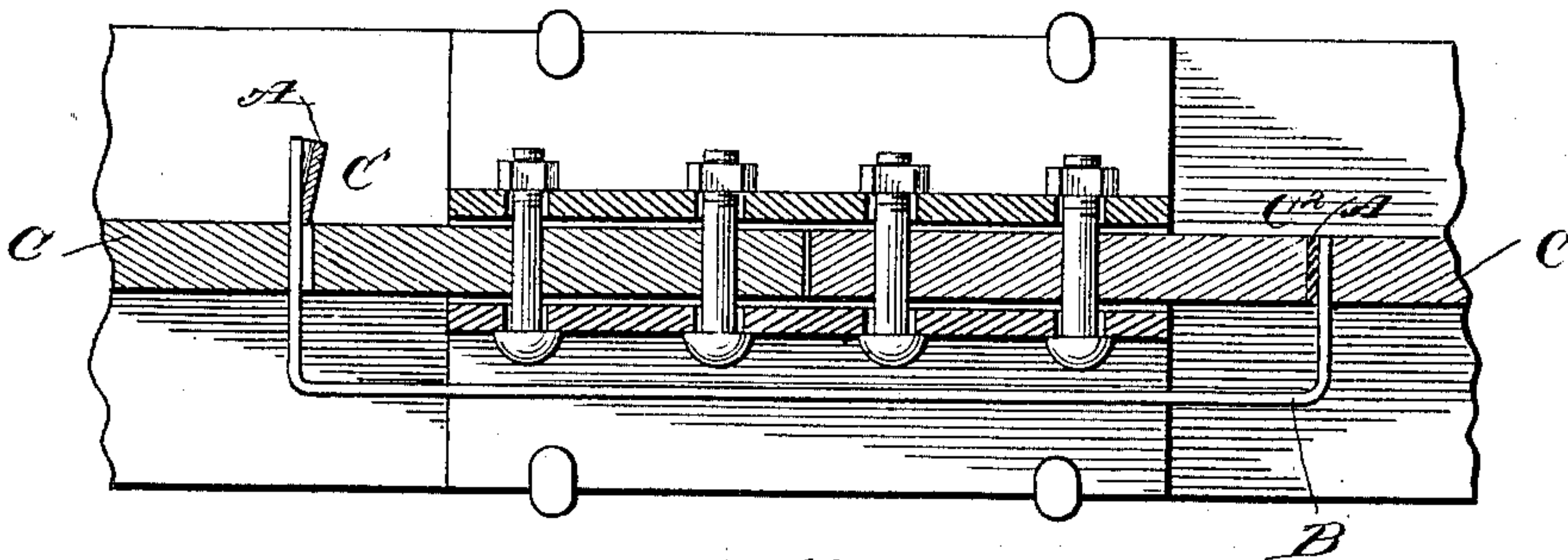


Fig. 6.

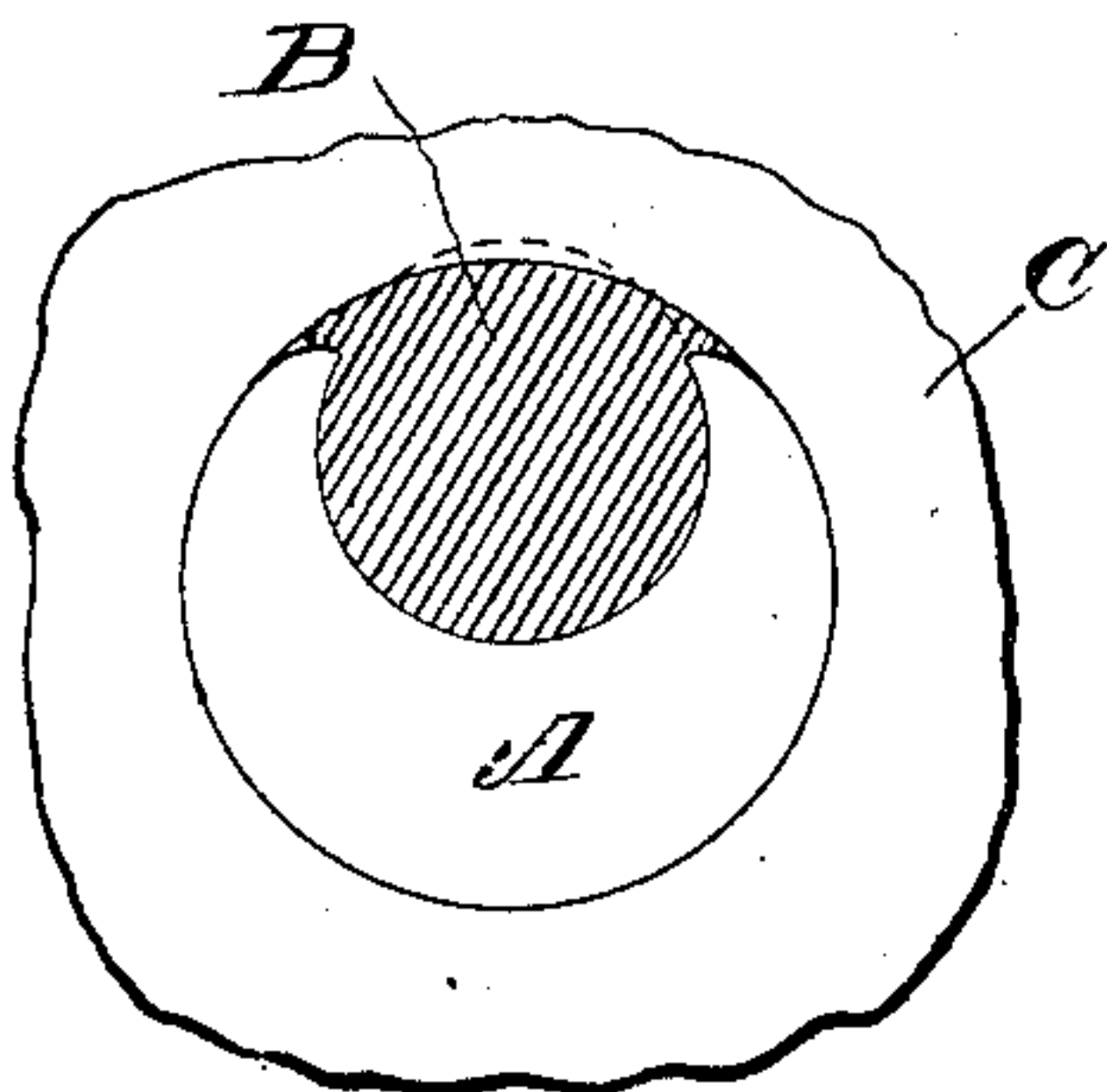


Fig. 1.

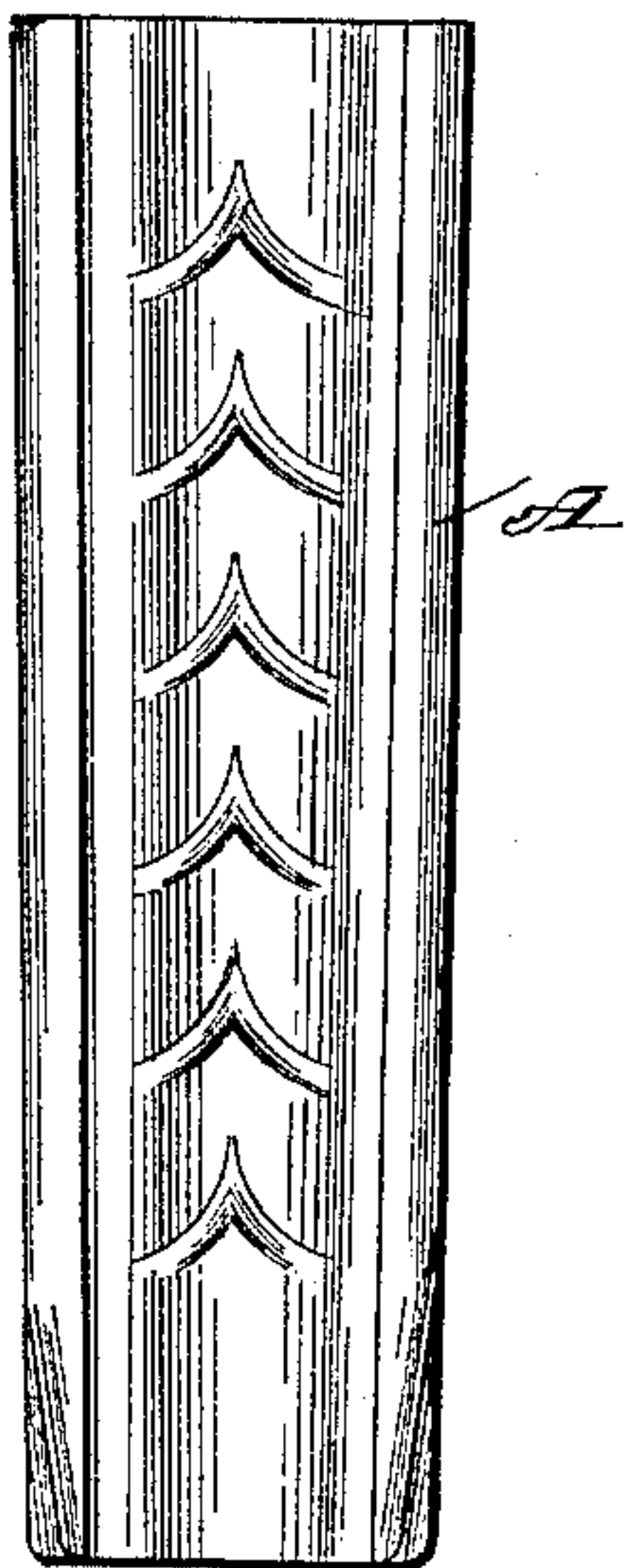


Fig. 2.

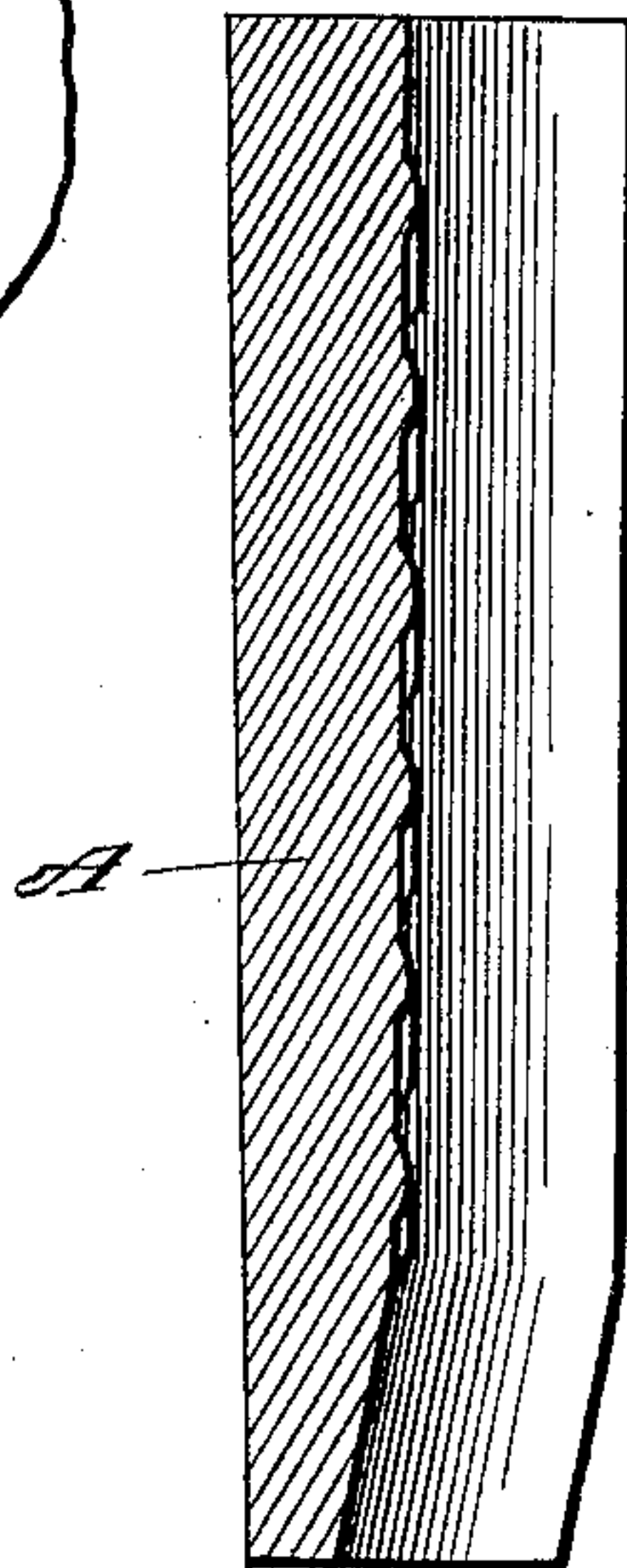


Fig. 7.



Fig. 3.

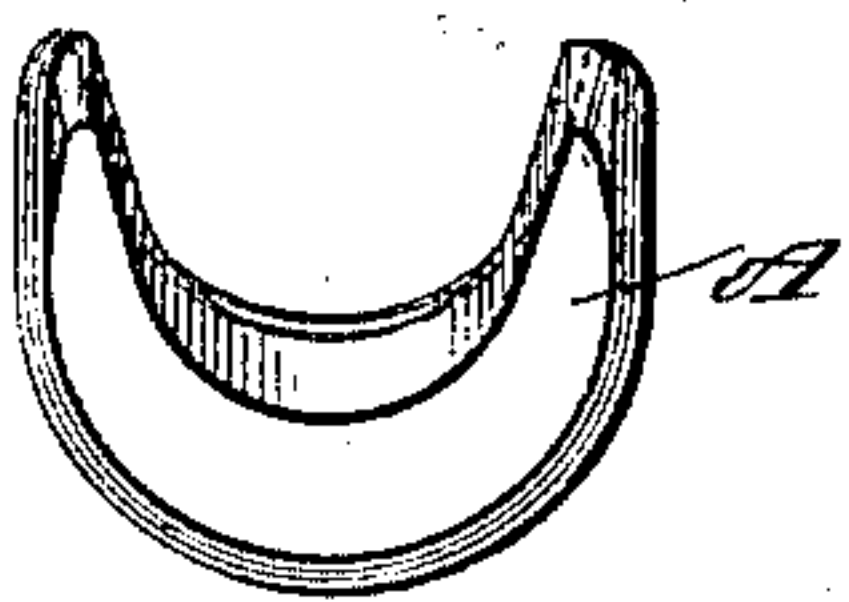
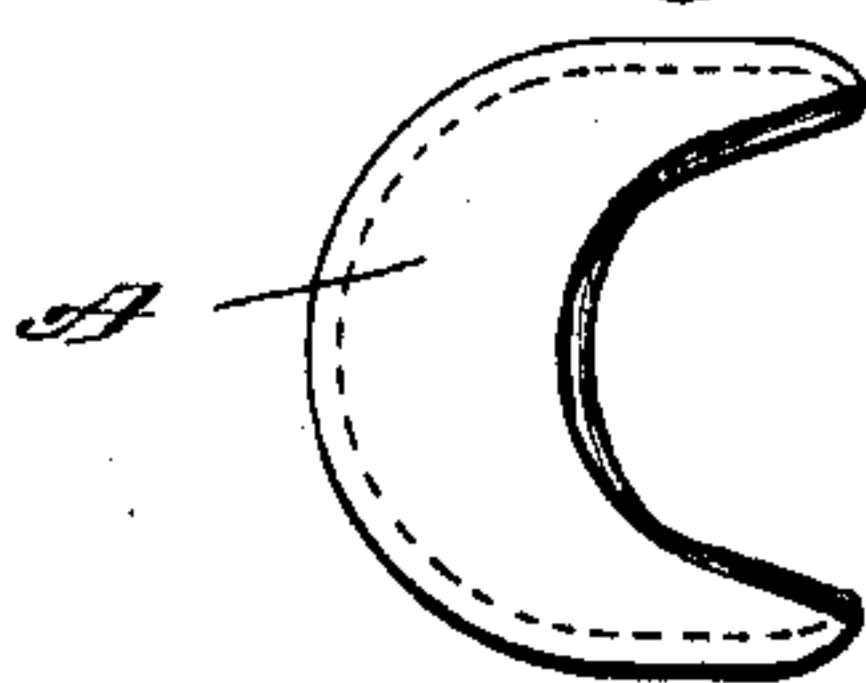


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

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BONDING-PLUG.

SPECIFICATION forming part of Letters Patent No. 686,941, dated November 19, 1901.

Application filed March 16, 1901. Serial No. 51,553. (No model.)

To all whom it may concern:

Be it known that I, WILLIS S. JONES, 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 Bonding-Plugs; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in bonding-plugs of that class used to connect and form the contact between electrical conductors, one of which is of small size as compared to the other. Heretofore several forms of bonding-plugs have been devised, some of which are tubular and all of which are difficult of construction and necessarily expensive and unsatisfactory in use.

My invention has for its object a construction which is simple and effective and one that can be made for a mere fraction of the cost of the others now on the market.

The invention consists of the matters hereinafter described, and more fully pointed out and defined in the appended claims.

In the drawings, Figure 1 is a plan view of a device embodying my invention. Fig. 2 is a longitudinal section of the same. Fig. 3 is an elevation of the small end thereof. Fig. 4 is an elevation of the larger end. Fig. 5 is a horizontal section of railroad-rails, showing use of the bonding-plugs and is shown in horizontal section. Fig. 6 is an enlarged detail of the bonding-plug in use. Fig. 7 is a fragmentary view of the larger conductor.

As shown, said connector or bonding-plug A consists of a plug or wedge of conducting material of substantially U shape in cross-section, tapered throughout its entire length and provided with a longitudinal groove of uniform depth for the entire length thereof. Said groove at its bottom is shaped to closely fit the surface or the curvature of a round conductor B, laid therein, and is slightly flaring at the outer edges. At the smaller end of the bonding-plug the flaring edges are cut away to a more abrupt taper, as indicated in Figs. 1 and 2, and the groove also inclines inwardly to permit of the plug being more read-

ily inserted in the aperture of the larger conductor C, as shown, a railroad-rail. Inasmuch as said plug tapers throughout its entire length and the groove therein is of uniform depth it follows that the same is of varying cross-section or width, as indicated in Figs. 3 and 4. For the purpose of providing means for gripping the conductors the bottom of said groove is preferably provided with corrugations, which become bedded in conductor B when in use. Said plugs may be constructed in any convenient way. Preferably, however, a wire is drawn to any desired length similar in cross-section to the cross-section of the plug and is cut and stamped by any desired means into suitable lengths of any desired size in the form substantially as herein described.

The operation of my invention is as follows: The larger conductor—in this instance a railway-rail—is apertured through the web thereof, said aperture being larger than the conductor designed to be joined therewith by means of said plug, but of less diameter than the diameter of the plug and conductor as shown in Fig. 6. The aperture in the rail is formed by means of a suitable punch or die, as shown in Fig. 7, so that the sharp angle or edge on the driving side is removed. The end of the wire B is then inserted there-through; and the tapered end of the plug is inserted from the opposite side of the aperture or that on which the sharp edge has been removed, as indicated at C' in Fig. 5. The plug is then driven into said aperture, assuming the position as indicated by C' in Fig. 5. The steel of the rail being harder than said plug or conductor B and the edges of the plug being relatively thin the same are turned inwardly around the periphery of the aperture into the angle formed between the small conductor and the larger conductor, practically filling the entire space. The wedging action of the plug also serves to flatten the wire B against the rail and beds the same into the corrugations at the bottom of the groove, when driven home the cross-section being similar to that illustrated in Fig. 6. The slot in said plug being of uniform depth, if said small conductor touches the metal of the larger conductor at all it touches

for the entire length of the same within said aperture, and the closing of the thin edges of said plug into the angle formed between said conductors forms a joint very nearly im-
 5 pervious to dirt, dust, or atmospheric moisture.

Heretofore it has been suggested to form a plug with a channel of varied depth, the deeper portion being at the larger end, so
 10 that as the plug, with its wire, was driven in the opening of the rail or larger conductor the extreme end portion of the wire would be larger, owing to the greater compression of the wire in the smaller end of the plug.
 15 This was found to be advantageous, but objectionable, owing to the liability of skiving or cutting the wire. It was thereafter suggested that the channel be made of uniform depth to avoid the objection. In my present
 20 invention I combine both types, and so by making the channel of uniform depth but varying width, thereby compressing transversely the wire in the smaller end of the plug more than that in the larger end of the
 25 plug, thus forming, in effect, a wedge at the end of the wire, preventing accidental withdrawal of the bond and at the same time preserving the advantages gained by the uniform depth of the channel.

30 Obviously many details of construction may be varied without departing from the principle of my invention.

I claim as my invention—

1. An electrical bonding-plug, tapered ap-
 35 proximately uniformly and provided with a longitudinal groove of approximately uniform depth and of varying width.

2. An electrical bonding-plug or connector, comprising a wedge tapered throughout its
 40 entire length, a longitudinal groove therein of uniform depth and varying width, the edges on each side of said groove being relatively thin and at the small end of the plug inclined downwardly to provide a more abrupt taper,
 45 the end of said groove being also inclined downwardly to preserve the uniformity of depth.

3. An electrical bonding-plug comprising a
 50 U-shaped wedge of metal tapered throughout, the groove therein being of uniform depth and varying width, the edges on each side of

said groove being divergent thin and tapering and adapted to conform with the curvature of the circular aperture when driven therein, said edges at the small end of the
 55 plug tapering abruptly and the groove inclining downwardly to preserve the uniformity of depth thereof, the back of said plug being straight throughout and transverse corrugations in the bottom of said groove hav-
 60 ing central points directed toward the broad end of the wedge.

4. A bonding-plug comprising a wedge tapered throughout its length, a longitudinal groove therein of uniform depth, but varying
 65 in width, the edges on each side of the groove being normally divergent but adapted to be inclosed around a conductor lying in said groove when in use.

5. A bonding-plug comprising a wedge of
 70 metal tapered from end to end and U-shaped transversely, the groove therein varying in width and of uniform depth, the taper near the small end of said wedge being more abrupt and the groove inclining downwardly
 75 thereby preserving the uniformity of the depth of said groove.

6. The combination with a large conductor having an aperture therethrough, one edge of which is rounded, of a small conductor ex-
 80 tending therethrough, a tapering bonding-plug having a longitudinal groove of uniform depth therein and varying width and corrugations in the bottom thereof said bonding-plug and small conductor being of such size
 85 in proportion to said aperture that when driven therein the wire is flattened against the large conductor and forced into said corrugations and the sides of the bonding-plug closed around the small conductor forming a
 90 tight joint.

7. A bonding-plug substantially U-shaped in cross-section and having a longitudinal channel therein of varying width and uniform
 95 depth, substantially as described.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

WILLIS S. JONES.

In presence of—

LOUIS J. DILSON,
 A. B. HILLS.