

W. G. GREY & W. GRIFFITH.
METHOD OF UNITING METALS.
APPLICATION FILED FEB. 23, 1910.

976,456.

Patented Nov. 22, 1910.
2 SHEETS—SHEET 1.

FIG. 1

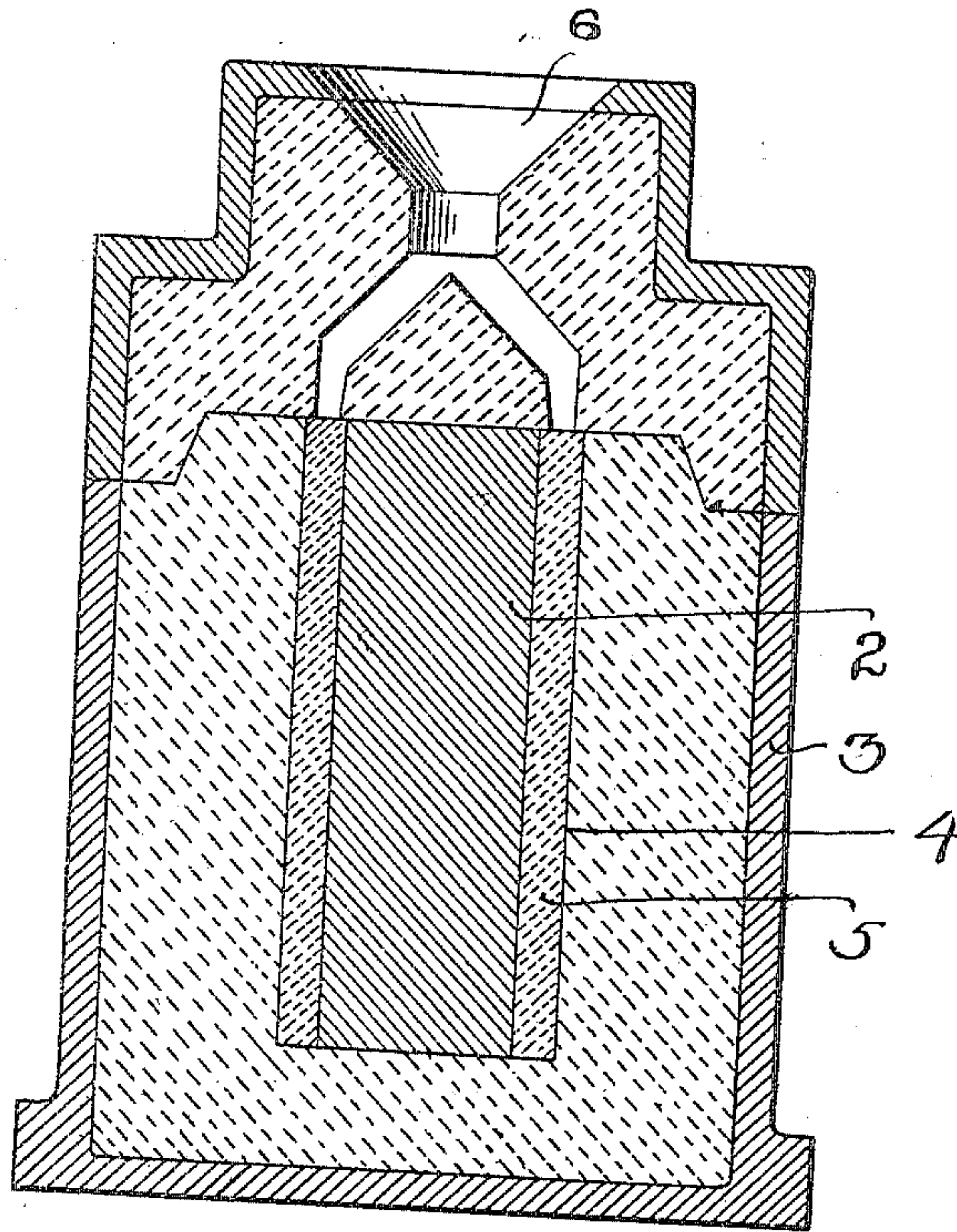
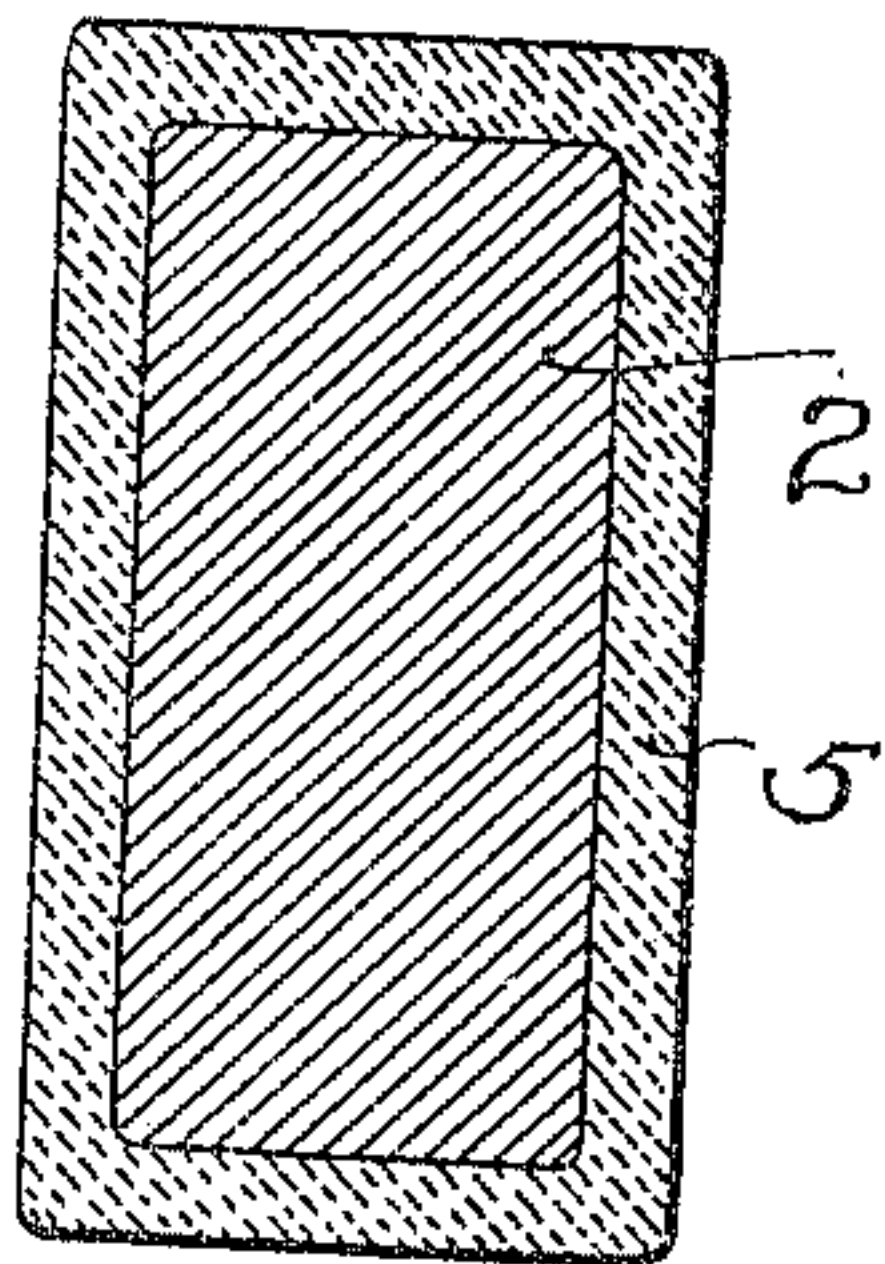


FIG. 2



WITNESSES

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FIG. 3

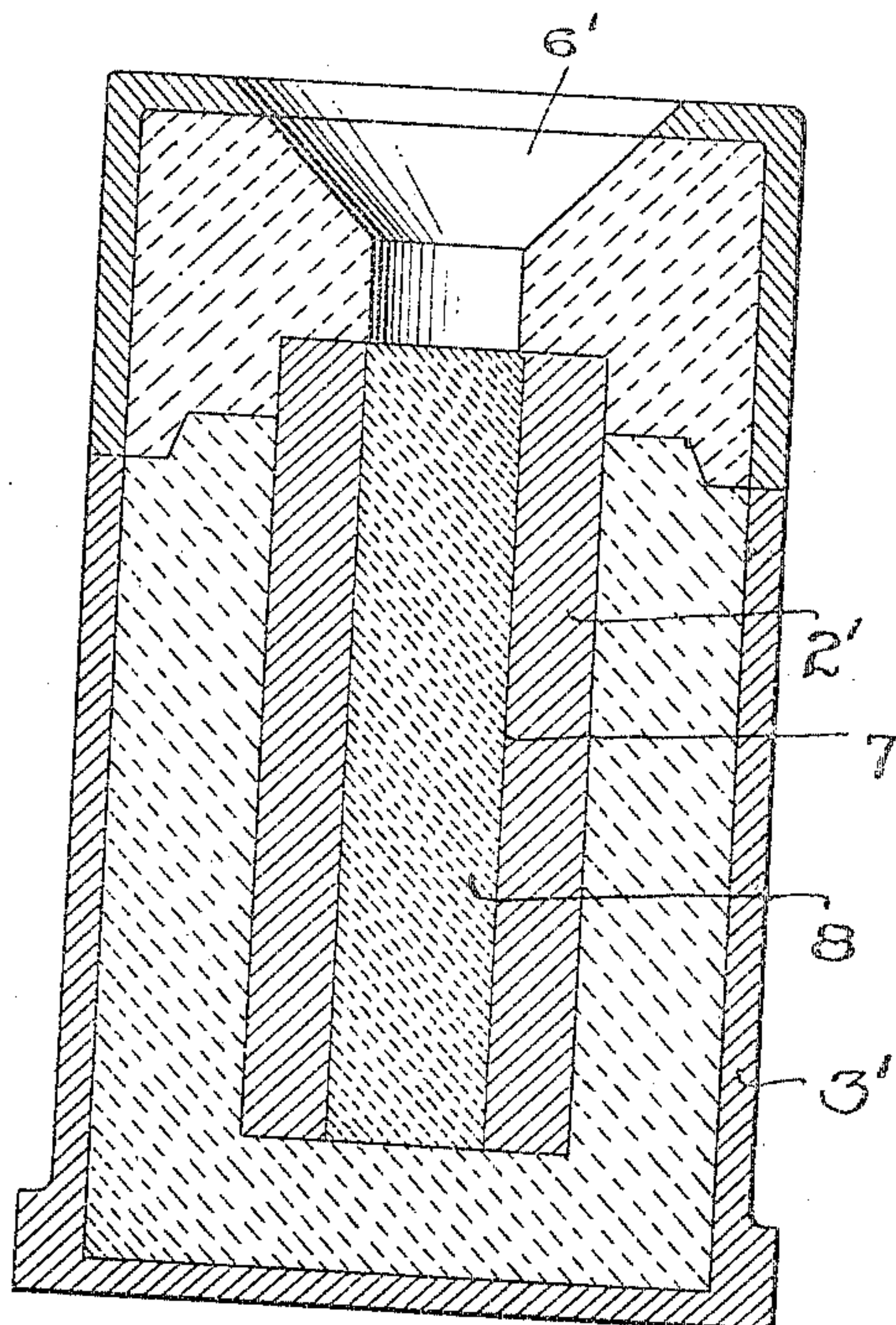
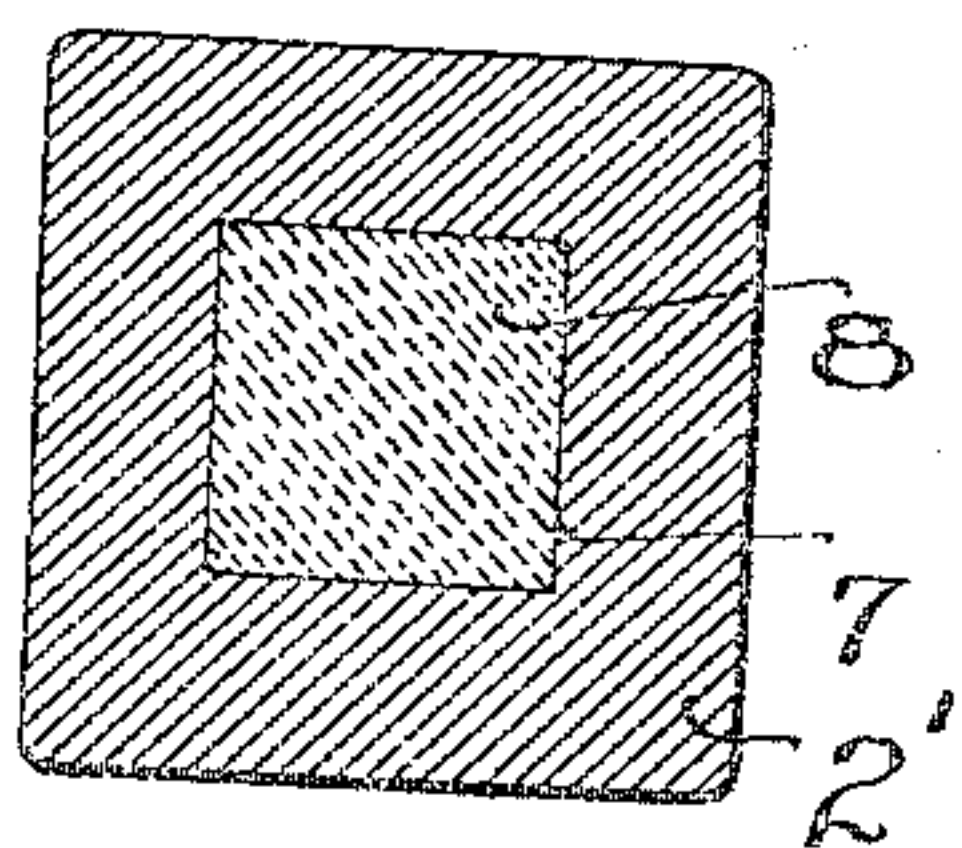


FIG. 4



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM G. GREY AND WILLIAM GRIFFITH, OF PITTSBURG, PENNSYLVANIA.

METHOD OF UNITING METALS.

976,456.

Specification of Letters Patent. Patented Nov. 22, 1910.

Application filed February 23, 1910. Serial No. 545,327.

To all whom it may concern:

Be it known that we, WILLIAM G. GREY and WILLIAM GRIFFITH, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Methods of Uniting Metals, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of this specification.

Our invention relates to a method of uniting metals of different kinds, such as iron and steel, with copper, brass, bronze, aluminum or other metals or alloy; and it consists, generally stated, in first subjecting the harder metal to a cleaning and other preparatory treatment, then applying in molten form the softer metal to be united thereto.

We will now describe our invention, referring to the accompanying drawings, so that others skilled in the art to which it appertains may understand and practice the same.

While in the accompanying drawings we have shown our invention as applied to the preparation of ingots, billets or bars, we do not desire to limit ourselves to any particular shape. For convenience, however, in describing our invention, we will hereinafter refer to the iron or steel bar or other shape as the "harder" body of metal.

Figure 1 is a vertical sectional view showing the body of harder metal placed in a suitable mold preparatory to receiving the softer metal in molten form; Fig. 2 is a sectional view of a billet or bar prepared by our improved method; Fig. 3 is a vertical sectional view corresponding with Fig. 1, but showing the preparation of a shape adapted to receive a core of softer metal; and Fig. 4 is a sectional view through such a structure, showing the core of softer metal.

In carrying out our invention, the body of harder metal 2 is first subjected to a cleaning or preparatory bath for the removal of the scale and oxid from the surface or surfaces to which the softer metal is to be united. This cleaning bath may be the ordinary acid solution used for this purpose. After this treatment, the body 2 may be given a coat of alkali solution, such as chromate potassium or chromate sodium, so as to prevent ready oxidation of the surface or surfaces thus cleaned. After

the body 2 of harder metal has received the above treatment, it is placed in a solution of salt of metal, sulfuric acid and alum. The particular metallic salt which we prefer to employ is sulfate of copper. This solution is preferably proportioned as follows, although it may be proportionately varied without departing from our invention and we do not therefore desire to limit ourselves to the specific amounts stated: 1½ lbs. sulfate of copper, 2 ounces sulfuric acid, 2 ounces of alum, to 1 gallon of water. The body is allowed to remain in this solution until it has received a deposit of copper.

After being given the above preparatory treatment the body is placed in a suitable mold preparatory to receiving the body of softer metal to be applied in molten form to the treated surface or surfaces of the said shape of harder metal 2. In Fig. 1 of the drawings, we have indicated such a mold by the numeral 3, having the cavity 4 wherein is placed the bar or billet 2, adapted to receive and be enveloped or inclosed by the molten metal 5, which is adapted to be introduced at the mouth 6 of the mold; the size of the cavity 4 being dependent upon the ultimate thickness to be given the coating of softer metal 5 after the prepared shape has been rolled or reshaped as desired.

In Figs. 3 and 4 we show the body of harder metal 2' as having the cavity 7 which, after receiving the above mentioned preparatory treatment, is adapted to receive in molten form the core of softer metal 8; the suitable mold 3', similar to the mold shown in Fig. 1, being provided for the application of the molten metal to the cavity of the harder body of metal.

The advantages of our invention will be appreciated by those skilled in the art. By adding the alum to the solution of metallic salt, the copper is caused to be deposited on the harder metal in an even, compact, homogeneous manner. It also facilitates this operation.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. The herein-described method of uniting metals, such as iron or steel with copper, brass, bronze, aluminum, or other metal or alloy, which consists in first cleaning the

harder metal, subjecting it to a solution of metallic salt and alum, and then applying in molten form the body of softer metal.

2. The herein-described method of unit-
5 ing metals such as iron or steel with copper, brass, bronze, aluminum or other metal or alloy, which consists in first cleaning the harder metal, applying a coating of alkali solution, subjecting it to a solution of metal-

lic salt and alum, and then applying in 10 molten form the body of softer metal.

In testimony whereof, we have hereunto set our hands.

WILLIAM G. GREY.
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Witnesses:

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MARY A. BARTH.