(No Model.) 2 Sheets—Sheet 1.

# F. A. GODFREY.

## PROCESS OF UNITING METALS.

No. 359,319. Patented Mar. 15, 1887.

*Fig. 1.*

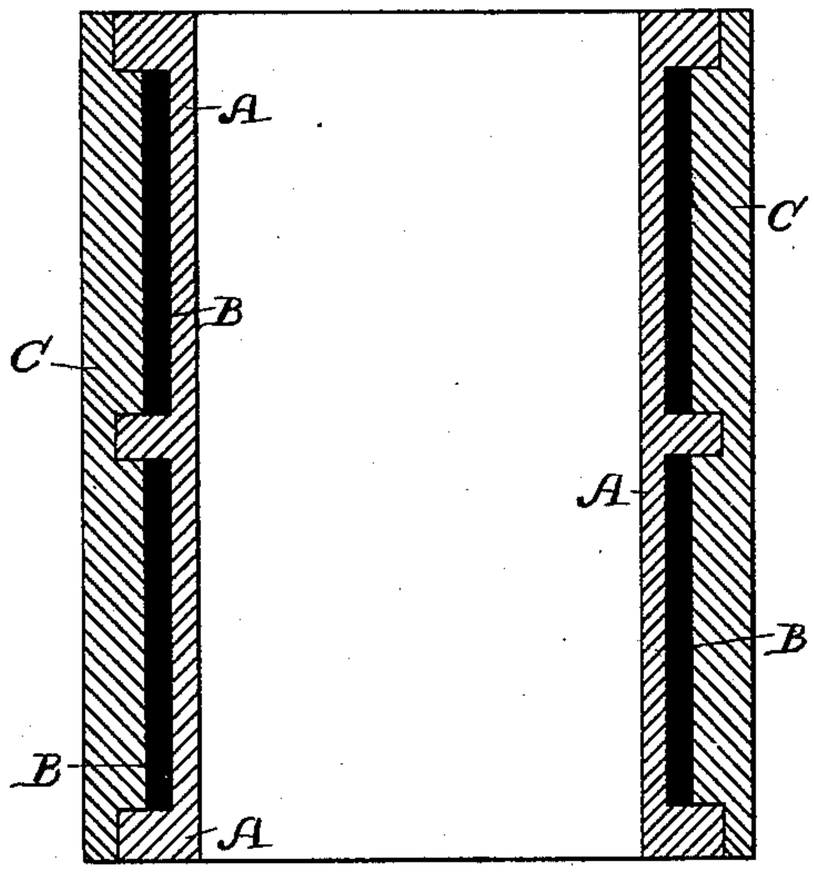
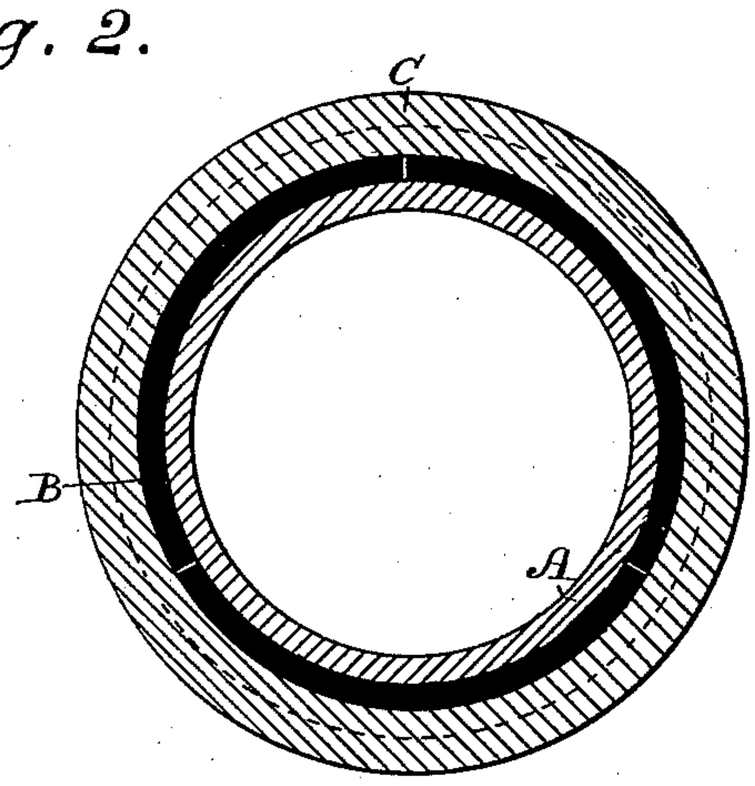



*Fig. 2.*




WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

# F. A. GODFREY.

## PROCESS OF UNITING METALS.

No. 359,319. Patented Mar. 15, 1887.

*Fig. 3.*

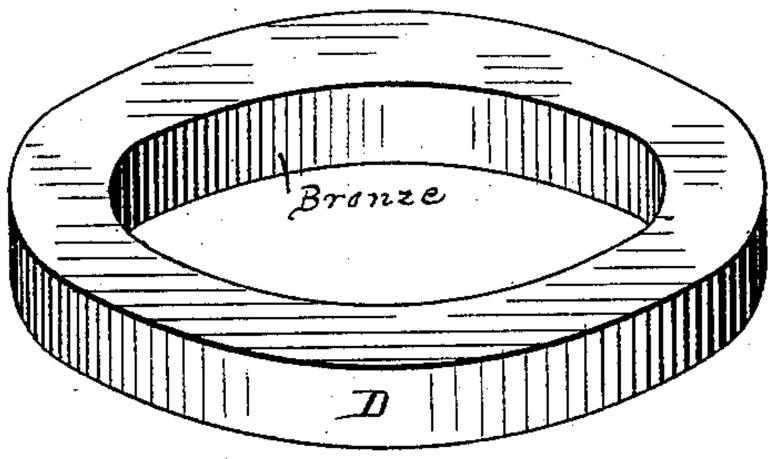



*Fig. 4.*

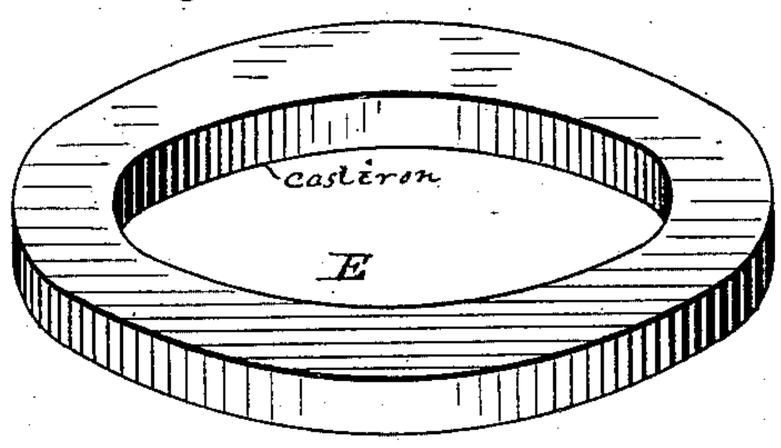



*Fig. 5.*

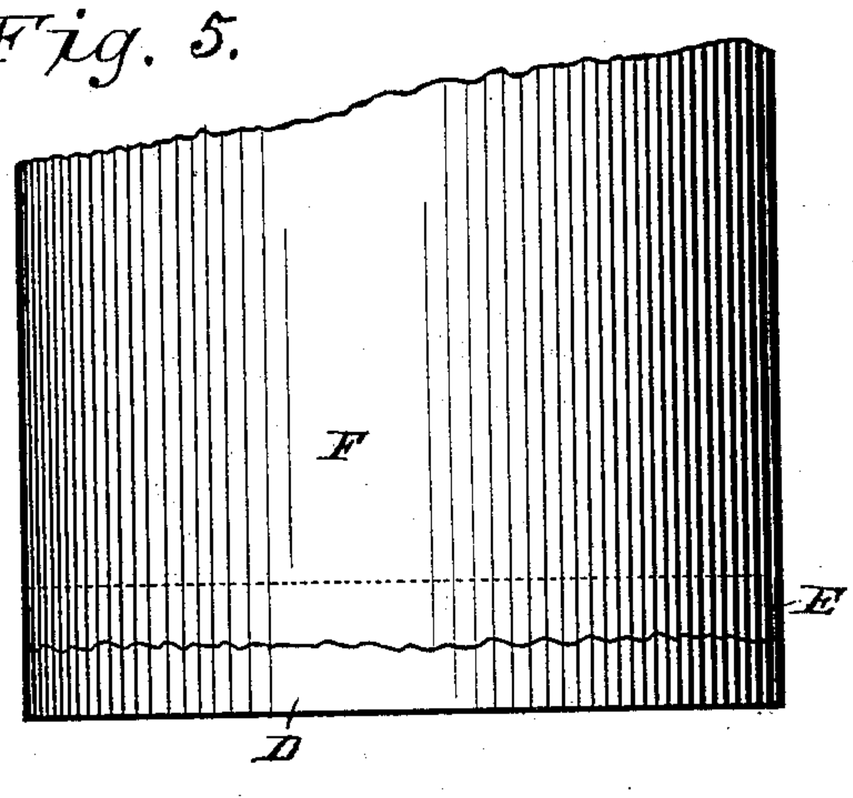
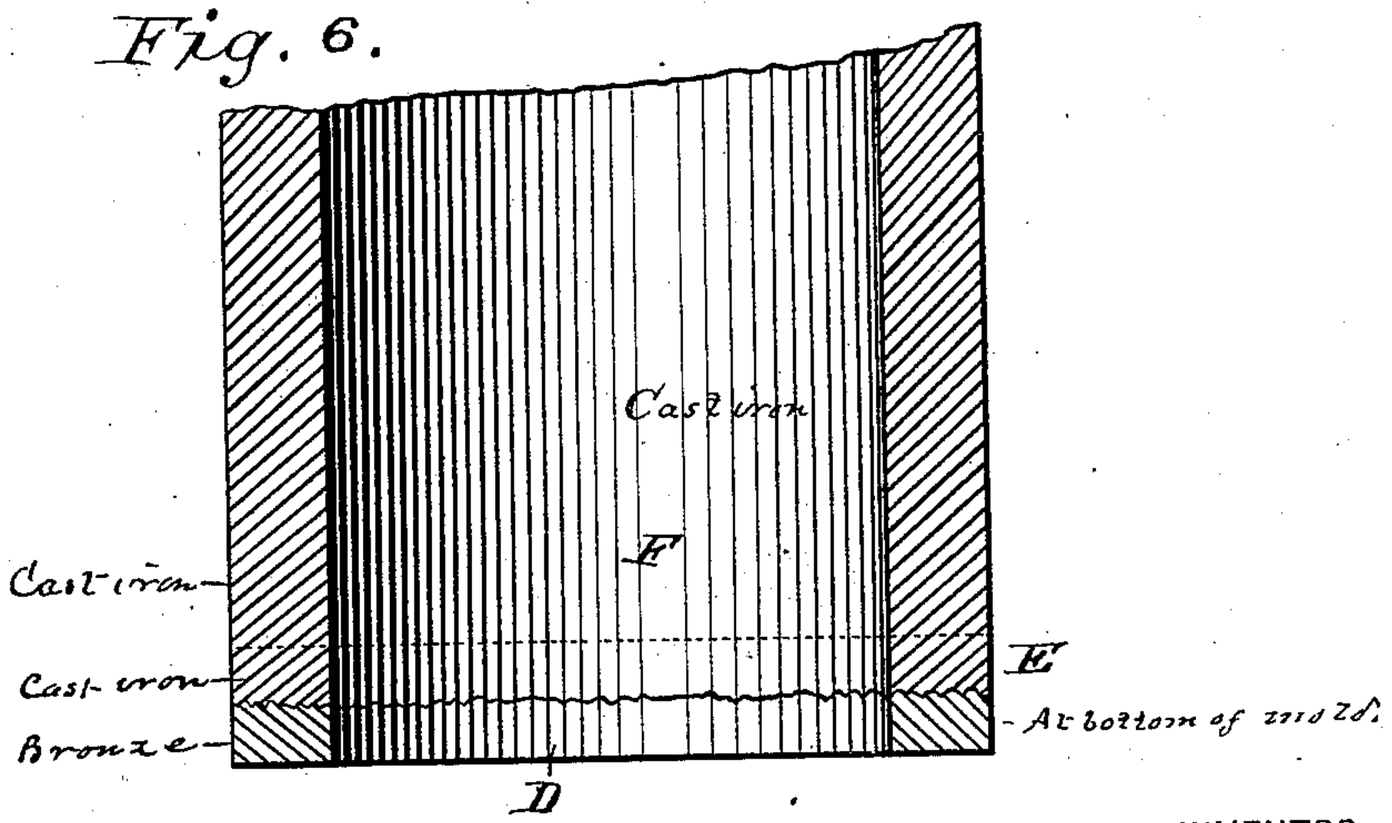



*Fig. 6.*

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# UNITED STATES PATENT OFFICE.

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## PROCESS OF UNITING METALS.

SPECIFICATION forming part of Letters Patent No. 359,319, dated March 15, 1887.

Application filed April 9, 1884. Serial No. 127,158. (No model.)

*To all whom it may concern:*

Be it known that I, FRED A. GODFREY, a citizen of the United States, residing at Holyoke, in the county of Hampden and Commonwealth of Massachusetts, have invented certain new and useful Improvements in the Founding of Metals, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention especially relates to the process of incorporating with castings of a given metal—such as iron—other castings already formed of a more fusible metal—such as brass or composition.

The object of my improvement is to provide a practical method of forming the first casting without the fusion of the second, and thus to join the two without the expense of fitting and mechanical connection. I attain this object in the manner hereinafter described, and, as far as the case admits, illustrated in the accompanying drawings, in which—

Figure 1 represents in section, and Fig. 2 in plan, a casting formed according to my present method, which will be further hereinafter explained.

These drawings are intended to illustrate the application of my method to the casting of a cylinder, C, of, say, cast-iron, with an interior lining or facing, A, of, say, brass. The lining A is first cast. Then when it is desired to form the cylinder C in union with it I first form a protecting shell or ring, B, of some metal of higher fusibility than the lining A, and at the same time not exceeding in fusibility the metal of which the cylinder C is to be formed. As cast-iron answers these requirements, we may consider B to represent an exterior protecting-ring of cast-iron. This having been put in place around the ring A and the whole being put in a suitable mold, molten cast-iron is then poured in to form the cylinder C. As this metal comes in contact with the ring B it fuses and unites with it, while at the same time the ring B gradually fuses and unites with the lining A. It will thus be seen that if the ring B is properly proportioned the whole mass will be properly united without injury to the brass lining.

Figs. 3, 4, 5, and 6 illustrate another application of the foregoing method, whereby a ring of brass or bronze, D, is cast in union with one of cast-iron, F, by means of the interposed ring of cast-iron E. The method of doing this being that already described, no further explanation is deemed necessary.

I do not confine myself herein to any particular application of this invention, nor to the use of any particular metal or metals.

I claim—

The herein-described method of forming a compound metallic mass, which consists in placing a metal of comparatively low fusibility in a mold; second, in placing over the same a protecting-piece of metal of higher fusibility; third, pouring against the latter piece molten metal, as above described, thereby fusing the intermediate protecting-piece and uniting the metals, as and for the purposes set forth.

FRED A. GODFREY.

Witnesses:
H. H. TRENORGY,
H. K. HAWES.