

(No Model.)

J. D. ELLIS.

Armor Plate and Method of Producing the Same.

No. 232,476.

FIG. 1. Patented Sept. 21, 1880.

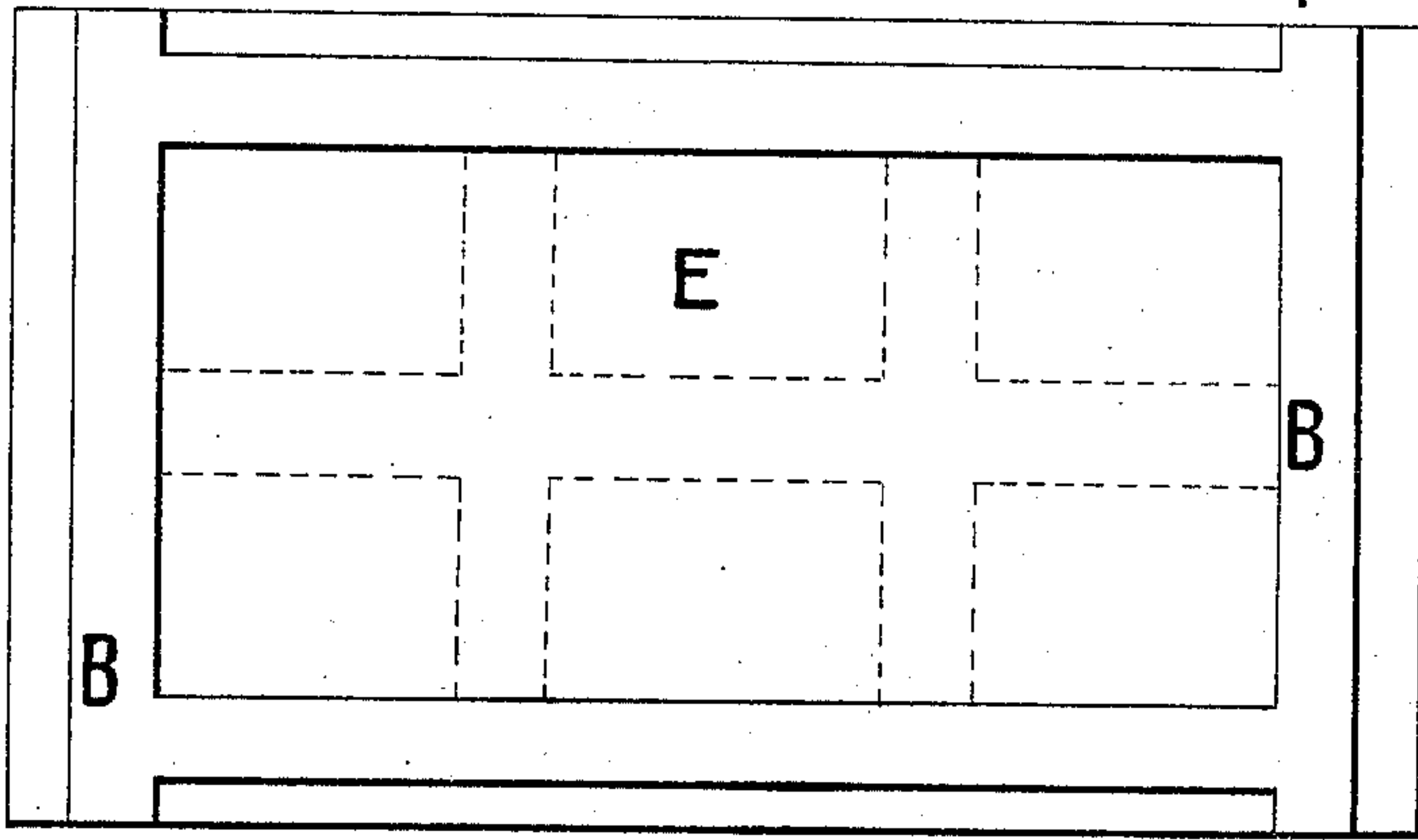


FIG. 2.

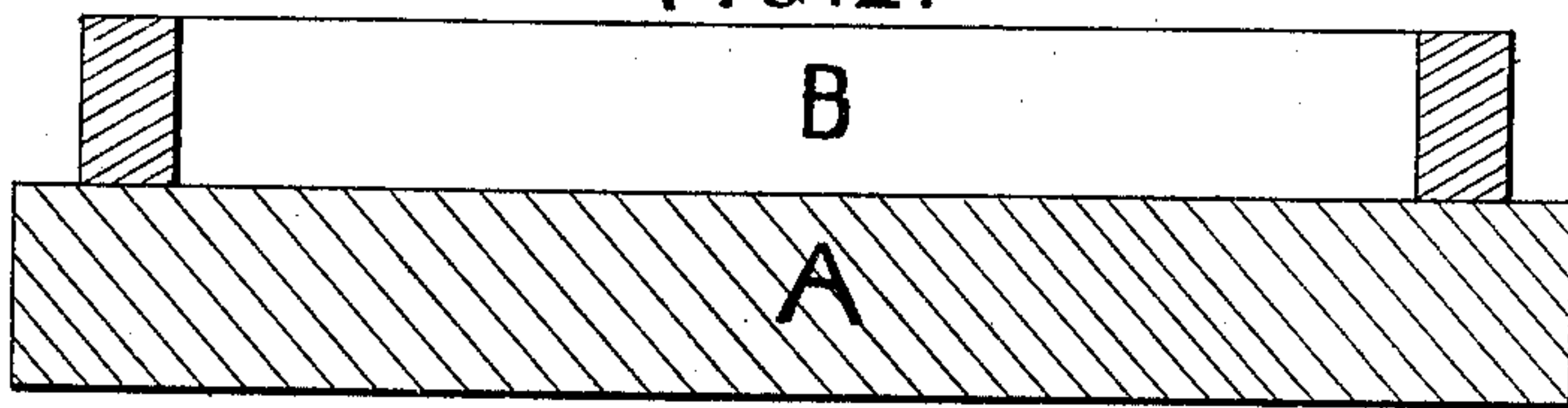


FIG. 3.

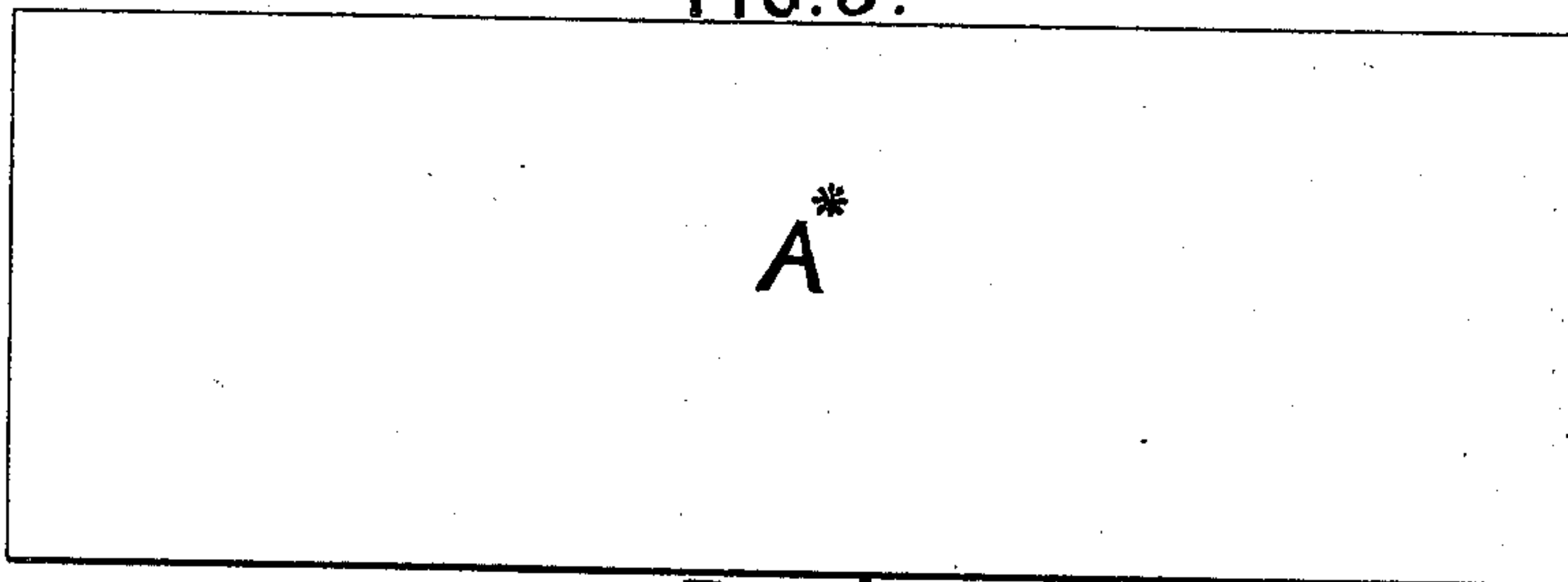


FIG. 4.

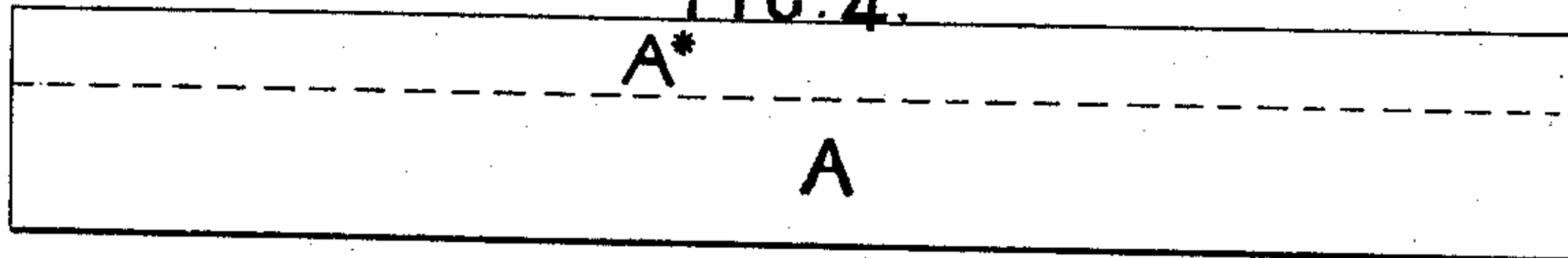
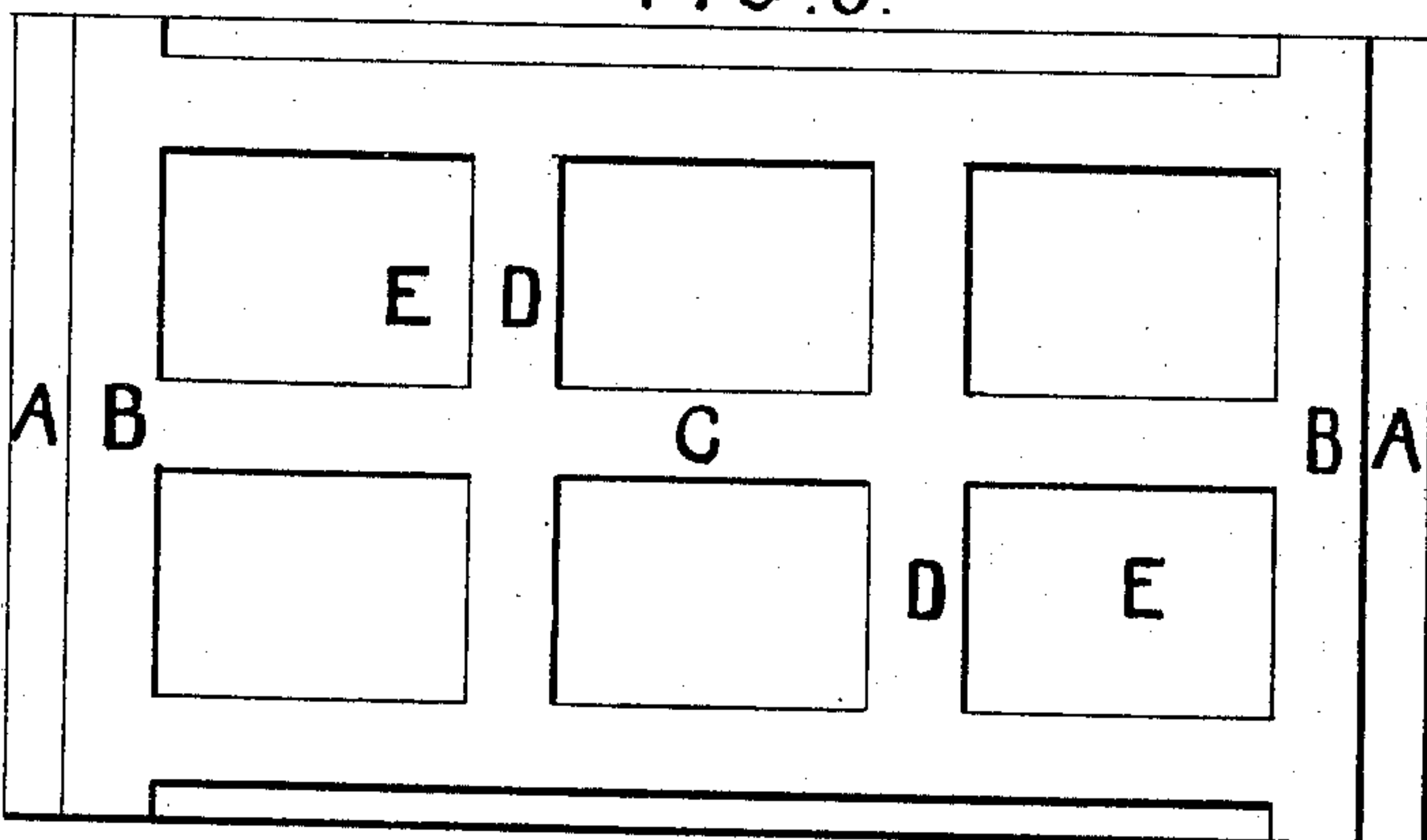


FIG. 5.



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UNITED STATES PATENT OFFICE.

JOHN DEVONSHIRE ELLIS, OF SHEFFIELD, ENGLAND.

ARMOR-PLATE AND METHOD OF PRODUCING THE SAME.

SPECIFICATION forming part of Letters Patent No. 232,476, dated September 21, 1880.

Application filed April 17, 1880. (No model.) Patented in England October 1, 1877.

To all whom it may concern:

Be it known that I, JOHN DEVONSHIRE ELLIS, of the Atlas Works, Sheffield, England, iron-master, have invented Improvements in Armor-Plates and Methods of Producing the Same, (for which I have obtained a patent in Great Britain, No. 3,662, bearing date 1st October, 1877,) of which the following is a specification.

My invention has for its object an increased facility in the manufacture of armor-plates composed of iron and steel combined or united, and also in the subsequent planing and finishing of the edges of such plates.

My invention consists in a novel process of making such combined iron and steel armor-plates—namely, in securing to the edges of a wrought-iron plate a wrought-iron frame projecting above the face thereof, in heating the plate and frame to a welding heat, and in filling the space within the frame when heated with molten steel nearly or quite to the level of the top of said frame, whereby the steel is united to the iron plate and frame. The combined iron and steel plate is then allowed to cool, so that the iron and steel may become welded together, and is afterward rolled into an armor-plate of any desired thickness. The iron frame may be constructed with intersecting bars or partitions.

The invention also consists in an armor-plate having a wrought-iron back and edges and a steel face welded to said wrought-iron back within and inclosed by the wrought-iron edges.

In some cases, also, it may be found desirable to insert longitudinally or transversely, or both, bars of wrought-iron, in order that the same may intersect the steel for the purpose of reducing the lengths of the cracks in the steel when penetrated by shot.

In the drawings, Figure 1 is a plan, and Fig. 2 a vertical section, showing a plate with an iron framing on it. Fig. 3 is a plan showing the steel portion of the plate. Fig. 4 shows the plate in side elevation, the portion above the dotted line being of steel and that below the same line being of wrought-iron. Fig. 5 is a plan showing an iron frame with longitudinal and transverse bars or partitions for intercepting the steel portion of the armor-plate.

A is a plate made of the usual quality of wrought-iron. B is a wrought-iron frame fixed on the plate, thereby inclosing a portion of the surface of the plate, onto which a suitable quantity of molten steel, A^x, (made by the Bessemer or other suitable process,) is to be poured in order to fill the said inclosure with steel of the depth or thickness required.

The height or depth and also the length and breadth of the frame B will be varied, as required, to suit the intended dimensions of the finished plate of combined iron and steel. This frame is or may be fixed together in its parts before heating in the furnace by dovetailing, or the parts may be otherwise fixed together.

C C are longitudinal bars, and D D are transverse bars, fitted into the frame B by dovetailing or otherwise, so as to divide the inclosure within the frame and form additional cells E E for the reception of molten steel, in order that the steel in the finished plate may be intersected by the said bars of wrought-iron.

In Fig. 5 the bars C C and D D are arranged so as to form six cells for the steel to be poured into; but this number may be varied. The bars C C and D D may be of the same height or depth as the frame B, or they may be of less height or depth than the frame.

In Fig. 5, also, the cells E E are shown as rectangular; but they may be otherwise formed so long as the bars or partitions C C and D D are arranged in such a manner as to divide into suitable cells the surface of the plate inclosed within the frame B, and thereby correspondingly divide the steel portions of the compound plate.

In Fig. 1 the dotted lines represent longitudinal and transverse intersecting bars.

With reference to the mode of manufacturing the entire armor-plate the iron portion thereof is made by the ordinary method of manufacturing wrought-iron armor-plates, and the bars forming the walls both of the frame and the cells are composed of a similar quality of iron.

After the iron plate with the frame or framing and bars has been heated in the furnace (which only differs in size from the ordinary reverberating iron-heating furnace) the steel may be poured on while the plate is in the furnace; but it is preferred to take the iron

plate with its frame, or frame and bars, from the furnace, and then pour the steel onto it. The combined iron and steel plate is then allowed to cool and solidify, after which it is
5 reheated in an ordinary furnace and reduced to the thickness required either by forging, pressing, or rolling, or by all or any of these processes in combination.

10 Figs. 2, 3, and 4 represent the relative forms and dimensions of the plate before and after rolling or other reducing and finishing process.

In finishing the compound plate the outside frame or framing may be either removed entirely or so as to leave a portion of it on the
15 edges of the said plate.

What I claim as of my invention is—

1. The process of making a combined steel and iron armor-plate, consisting in securing to the edges of a wrought-iron plate a wrought-
20 iron frame projecting above the face thereof in heating the plate and frame to a welding heat, and in filling the space within the frame when so heated with molten steel nearly or

quite to the level of the top of said frame, substantially as specified. 25

2. The process of making a combined steel and iron armor-plate, consisting in securing to the edges of a wrought-iron plate a wrought-iron frame projecting above the face thereof and provided with intersecting bars or partitions, 30 in heating the plate and frame to a welding heat, and in filling the spaces formed by the intersecting bars or partitions and frame when so heated with molten steel nearly or quite to the level of the top of said frame, substan- 35 tially as specified.

3. An armor-plate having a wrought-iron back and edges and a steel face welded to said back within and inclosed by the wrought-iron edges, substantially as specified.

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