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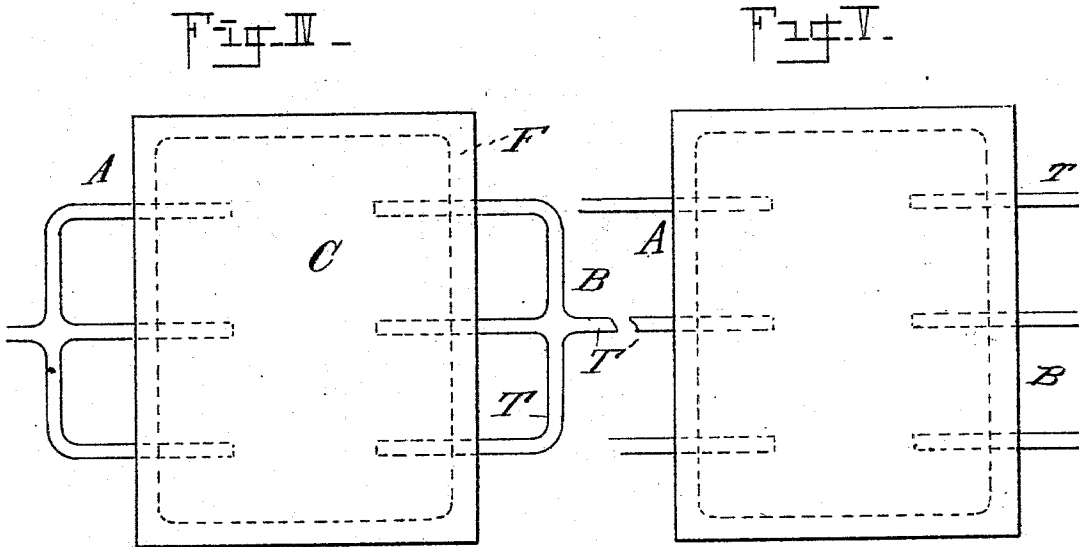
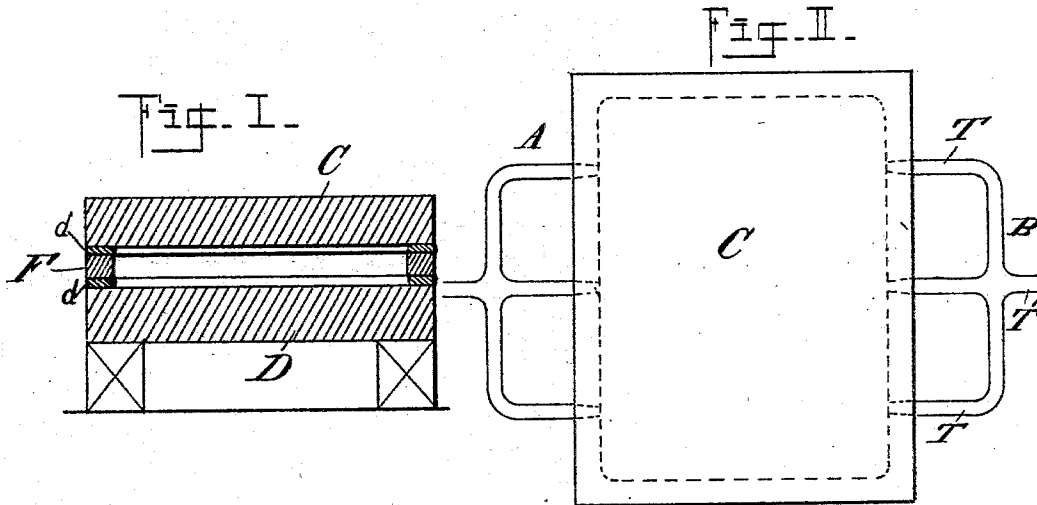
2 Sheets—Sheet 1.

H. SCHNEIDER.

PROCESS OF CEMENTING ARMOR PLATES.

No. 515,505.

Patented Feb. 27, 1894.



Attest:
Arthur H. Cobb.
Samuel H. Fisher.

Inventor:
Henri Schneider
by Jollok Mauro.
his attorneys.

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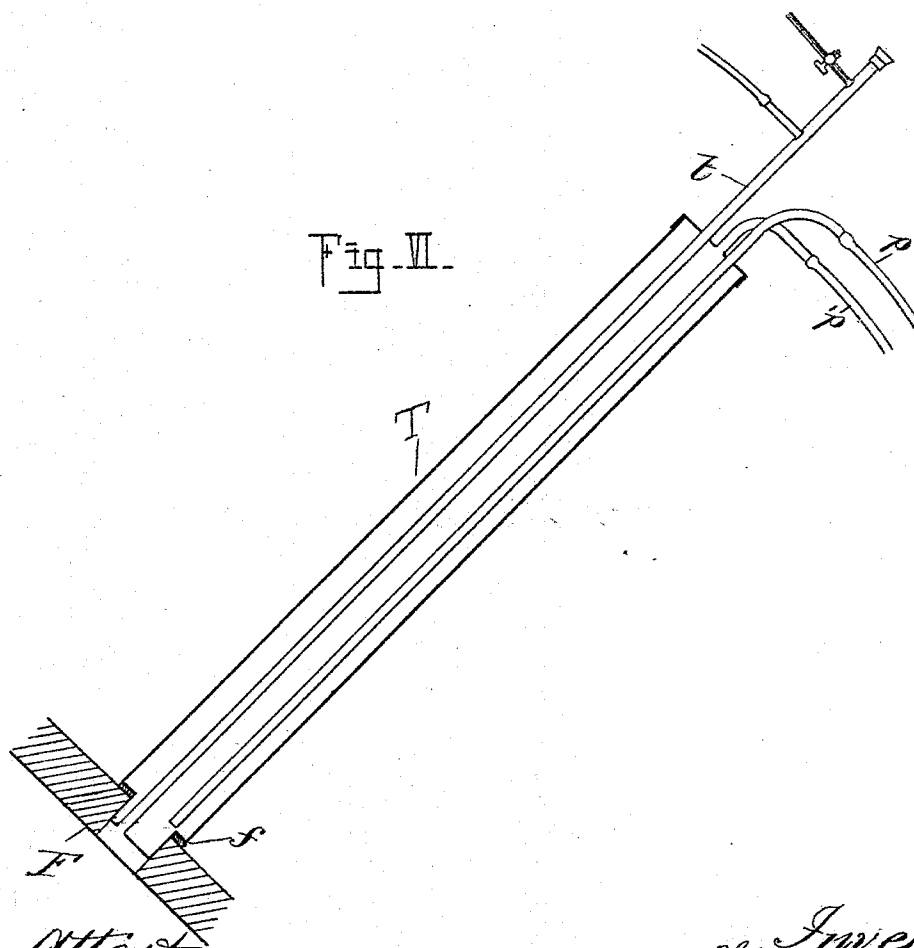
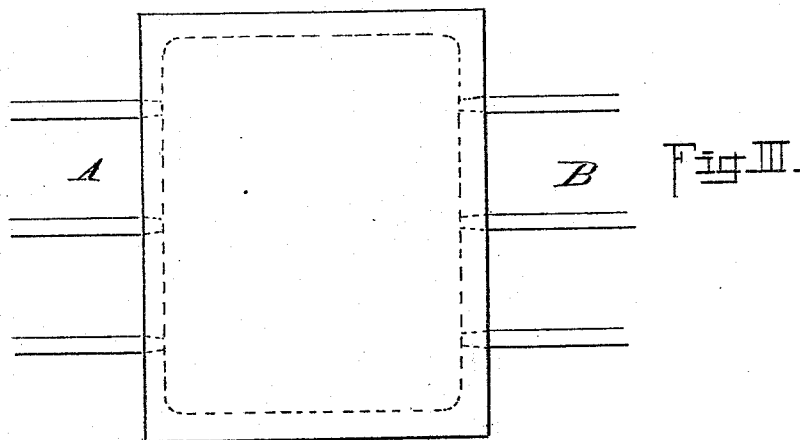
2 Sheets—Sheet 2.

H. SCHNEIDER.

PROCESS OF CEMENTING ARMOR PLATES.

No. 515,505.

Patented Feb. 27, 1894.



Attest.
Arthur H. Erb.
Daniel H. Fisher.

Inventor:
Henri Schneider
by J. J. Mauro
his attorneys.

UNITED STATES PATENT OFFICE.

HENRI SCHNEIDER, OF CREUZOT, FRANCE.

PROCESS OF CEMENTING ARMOR-PLATES.

SPECIFICATION forming part of Letters Patent No. 515,505, dated February 27, 1894.

Application filed September 4, 1893. Serial No. 484,778. (No specimens.) Patented in France March 15, 1893, No. 228,637.

To all whom it may concern:

Be it known that I, HENRI SCHNEIDER, a resident of Creuzot, Department of Saône-et-Loire, France, have invented a new and useful Improvement in Cementation of Armor-Plates, (for which I have obtained a French patent, No. 228,637, dated March 15, 1893,) which improvement is fully set forth in the following specification.

10 The present invention is an improvement upon the process described in my application of even date herewith, Serial No. 484,777, for cementing or hardening armor plates by a super-carbonization of the exterior surface of
15 such plates.

According to the present improvement I replace the cover and refractory material, which limited the capacity of the gas chamber, by an iron or steel frame, constructed in
20 such way that it adapts itself to the form of the plate to be treated, and which is interposed between the two plates, so that the weight of the upper plate resting upon this frame tends to make a tight joint, the tightness of
25 the joint being further assured by strands or strips of asbestos, which are compressed or packed tightly by the weight of the plate. By this means I constitute, in a simple and satisfactory manner, a gas-tight chamber in which
30 the carbonizing gas may be retained at a suitable pressure (say a pressure equal to or exceeding twenty inches of water) whereby the gas is caused to penetrate the metal to a considerable depth when the molecules of the
35 latter are spread by heat. Finding that the cementation is more intense and energetic in the immediate vicinity of the gas-inlets, I insure the utmost regularity of treatment by multiplying the points of admission of the
40 gas, and with the same object in view I admit the gas alternately from opposite sides of the chamber or inclosure as hereinafter explained.

45 In the drawings accompanying this specification, Figure I, represents in end elevation an arrangement for the simultaneous cementing of two plates. Figs. II, III, IV and V are top views representing arrangements of the tubes which supply the gaseous agents
50 employed in the process, and Fig. VI represents the construction of the gas supply tubes as described in my application aforesaid.

In treating two plates simultaneously the cover or chamber of refractory material, forming the inclosed space in which the gaseous agents act upon the plate, is replaced by
55 a frame F, of iron or steel, having an outline corresponding to that of the plates C, D. Tight joints between the frame F and the adjacent faces of the plates are formed by
60 asbestos packing *d* which may be in the form of sheets or strands. The weight of the upper plate C compresses the asbestos to such an extent as to constitute a satisfactory joint. The weight of this frame can vary from one
65 point to another.

If there were for one operation, but one plate to be cemented, the lower plate or the upper plate would be replaced by any sort of plate of iron or steel, of suitable thickness,
70 and able consequently to serve for several operations.

The tubes for supplying the gas are arranged substantially as in my aforesaid application, and as illustrated in Fig. VI. The
75 outer tube or jacket T is fitted at its inner or lower end into the frame F, and a tight joint made by means of asbestos packing *f*. Several of these tubes are used, and they may be independent, as shown in Figs. III and V or
80 connected with a common tube T' as in Figs. II and IV. The tubes may, as shown in Figs. IV and V extend a greater or less distance into the chamber formed by the frame F and plates
85 C D.

To insure greater regularity of treatment gas supply tubes are arranged on both sides A and B, of the plates, and the admission of gas is effected alternately from the opposite
90 sides. When the gas enters from the side A, the gas in excess passes off by the tubes on the side B of the plate, and vice versa. Consequently no special discharge tube for the gases is required, the tube *t* (Fig. VI) serving alternately as a supply and as a discharge
95 pipe.

The pipes *p p'* serve respectively to convey water to and from the water jacket T.

The supply of gas to the inclosed chamber may be continued during the entire operation,
100 or it may be interrupted for longer or shorter intervals, or may be replaced by an inert gas. Such interruption of the supply of the gaseous cementing agents is useful, because,

with illuminating gas, such as preferably employed, the carbonization of the metal proceeds very rapidly on the surface, and the carbon has not time to penetrate to the desired depth. During the periods of interruption of the current of gas, that in the chamber undergoes decarbonization, becoming gradually inert and the carbonization of the surface stops. On the other hand the carbon in excess at and near the surface diminishes by penetrating to a greater depth, so that, as a final result, a thicker zone or layer of cementation is produced than could otherwise be obtained.

The arrangement of apparatus shown and described admits of the perfect control of the operation, which is one of its advantages over the ordinary process of cementation of armor plates.

I claim as my invention—

1. The described process of cementation for armor plates &c. consisting in arranging two plates with an interposed frame upon which the upper plate rests thus making tight joints with the surfaces of said plates, and admitting gaseous cementing agents to the chamber formed between said plates, substantially as described.

2. In the process of cementing armor plates &c. the improvement consisting in forming a closed chamber in contact with the surface

of the plate or plates, and admitting gaseous cementing agents to said chamber alternately from opposite sides thereof, using the gas pipes or conduits alternately as supply and discharge pipes substantially as described.

3. In combination with the two plates to be cemented, a frame interposed between said plates, provided with gas-inlets and a packing of asbestos between the frame and plates held in place by the weight of the latter, the whole forming a chamber for the gaseous agents to act upon the surfaces of the plates, substantially as described.

4. The combination with the frame and the plates forming therewith a closed chamber, of gas supply tubes arranged on opposite sides of said frame, substantially as described.

5. In the process of cementing armor plates by means of gaseous cementing agents, the improvement consisting in interrupting the supply of cementing gases at intervals and replacing them with an inert gas, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HENRI SCHNEIDER.

Witnesses:

CHARLES LAUREAU,
HIPPOLYTE OLIVIER,
Both of Dijon.