

# UNITED STATES PATENT OFFICE.

JOHN W. KIDWELL, OF WASHINGTON, DISTRICT OF COLUMBIA.

## MANUFACTURE OF GLAZED IRON.

SPECIFICATION forming part of Letters Patent No. 503,423, dated August 15, 1893.

Application filed October 18, 1892. Serial No. 449,246. (No specimens.)

*To all whom it may concern:*

Be it known that I, JOHN W. KIDWELL, of Washington, in the District of Columbia, have invented a new and useful Improvement in the Manufacture of Glazed Iron, which is fully set forth in the following specification.

The object of the present invention is to impart to the surface of iron a protective coating or glaze similar in properties to that of Russian sheet-iron.

The coating or glaze produced according to this invention is a layer or film, of greater or less thickness, of a titanic compound combined or united with the iron or steel body in such manner as to be practically a part thereof. This layer or coating is usually of a dull steel-blue color and is distinguished mainly by its resistance to oxidation and corrosion. It forms a practically inoxidizable surface to the iron or steel body upon which it is applied or formed.

I produce the described glaze or coating by using, in the manner hereinafter pointed out, a mineral paint such as described in an application of even date herewith (Serial No. 449,247) and which is composed of titanic compounds mixed with asphalt, or other suitable hydrocarbon.

In preparing the paint or coating which is used in carrying out the invention I employ the titanic minerals (menaccanite, &c.,) found in association with certain phosphate ores, grind the mineral to an impalpable powder, and then mix it with asphalt, or other suitable hydrocarbon such as paraffine, coal tar, and the like, and with a suitable liquid medium to impart the desired fluidity. The surface of the iron is covered or coated with this mineral paint, which then forms on the iron, as on other substances, a non-oxidizable protective surface, as specified in the above mentioned application. This paint constitutes, of course, a mere coating distinct from the iron, and which though more adherent than most mineral paints, can be scraped off, exposing the surface of the iron in its original condition.

The glaze or coating which is the special object of the present invention, is obtained by heating either the paint or the iron or both, and thereby producing a chemical or molecular change upon the surface of the iron

itself. I have not been able to determine the precise nature of the combination that ensues between the iron and the titanic compound; but as before stated, the glaze has the properties of Russian iron. It is not affected by atmospheric influences, or by strong acids, but it is evident from my experiments that when the iron and titanic mineral are brought into contact and heated, a strong and permanent combination takes place between the iron and the mineral, and it appears that the presence of carbon assists in bringing about this union. When the paint is dried and scraped off with a sharp instrument, the glaze is exposed, and from every test appears to be an integral part of the iron itself, as distinguished from a mere coating, such as formed by the paint. As a further indication that a chemical or strong molecular combination takes place between the iron and mineral, it may be stated that upon other metallic surfaces, as copper, the treatment has no analogous result; but when after similar treatment the paint is scraped off the copper surface is exposed, exhibiting no change of condition. In applying the paint it will suffice to employ a temperature of from 250° to 450° Fahrenheit and upward. It is preferable to use high temperatures, as the reaction takes place more rapidly, and the best results are thereby obtained. The degree of heat applied and the length of time during which the operation is conducted will determine the thickness of the coating or glaze, that is to say the distance from the surface of the iron inward to which the titanium will penetrate.

The process, as detailed above, is that which is found most efficient and practical; but it will be obvious to chemists that the desired combination of iron and titanium mineral may be effected without following precisely the mode of procedure herein specified. The essential condition is to expose the entire surface to be covered to the action of titanic compound when the heat is applied, and the use of a paint in which the mineral is uniformly mixed is found a convenient and effective way of securing the essential condition.

I claim as my invention—

1. The process of forming on iron surfaces a titanium glaze, by applying a titanic min-

eral compound to the surface of the iron in close contact therewith, and heating the same, substantially as described.

2. The described process of forming in or  
5 upon the surface of iron bodies an incorrodible coating or glaze, by first forming a paint or mixture of pulverized titanic mineral herein specified and asphalt, and applying the same to the surface of the body, and heating  
10 until a union between the iron and titanium is effected, substantially as described.

3. As a new product, an iron sheet or body having on its surface a glaze composed of a titanium compound combined with the iron, as set forth.

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

JOHN W. KIDWELL.

Witnesses:

PHILIP MAURO,  
REEVE LEWIS.