

UNITED STATES PATENT OFFICE.

WILLIAM H. WHERRY, OF CLEVELAND, OHIO.

FLUX.

SPECIFICATION forming part of Letters Patent No. 750,512, dated January 26, 1904.

Application filed April 6, 1903. Serial No. 151,300. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM H. WHERRY, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Fluxes for Uniting Metals, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to fluxes, and particularly to such fluxes as are employed in uniting two metals, its object being to provide a flux which shall enable metals to be much more easily and yet more intimately and permanently welded than has been possible by the use of the fluxes heretofore employed. Said invention consists of means hereinafter fully described, and specifically set forth in the claims.

It is intended in my invention to provide a flux that shall perform the following functions, which are highly serviceable in obtaining a ready and complete weld between two metals. It shall combine chemically with both the metals to be united, lower the fusing-points and increase the fluidity of both metals, clean the surfaces of both metals, and thereby admit of more perfect contact between them, by dissolving the oxids of both metals and reducing them to the metallic condition, and when volatilized remove oxygen from the contact-surfaces both by removing the air mechanically and by combining chemically with the oxygen of the air.

Said improved flux is designed for use either by being mixed with one of the metals when in a molten condition or by being applied to the surface of one of the metals when cold or by being both mixed with one of the metals when molten and applied to the other metal when cold. Said flux may be applied to the surface of a cold metal either alone or mixed with enough acid (muriatic acid preferred) to make it pasty, whereby it is applied much more conveniently and securely, the acid having, furthermore, a cleansing as well as a binding action upon the metal. Which of the above uses that is adopted and the amount of the

flux to be used depend upon the especial metals which it is desired to weld together and the purpose of the weld thus obtained. The acid acts as a wash upon the metal by removing impurities from its surface, care being taken, however, that the acid be not of such a character or strength as to also have a deleterious chemical action upon the metal. Muriatic acid serves the purpose admirably, since it forms a pasty mass which clings to the metal and dissolves or washes off any impurities that may be upon it in the form of oxids or otherwise, while at the same time there is no deleterious chemical action between it and many of the metals and absolutely no chemical action between it and the metalloids which constitute my improved flux and with which the acid is mixed.

Although the uses to which my flux can be put in uniting two metals are varied, it is especially serviceable in uniting copper and steel, a reference to and a description of which use will constitute my preferred method of application. I shall be understood to include in the term "steel" all kinds of iron.

I have found that the metalloids are fluxes which embrace all or a part of the above-described characteristics. I use the term "metalloid" narrowly to include elements such as sulfur, phosphorus, boron, silicon, &c., all of which combine chemically with both steel and copper and possess, furthermore, some or all of the other characteristics noted, but of course do not claim volatility for such elements as silicon or carbon, &c., well known to be non-volatile at the temperature attained when copper and steel are welded, nor by the term "metalloid" do I include in any way elements not capable of combining chemically with both steel and copper. Of the metalloids above mentioned I prefer phosphorus for use as my improved flux and have found by experiment that amorphous red phosphorus proves to be the surest, most economical, and effective.

A practical application of the great utility of my improved flux for uniting copper and steel may be seen in the casting of rail-bonds integral with steel rails, in which use the flux is preferably applied to the extreme ends of

the electrical connector between two rails in an amount sufficient to slightly coat said ends with the flux for about a quarter of an inch, the amount that is put into the molten copper for this especial use being approximately three ounces of the flux to eighty pounds of copper, if red phosphorus is the flux that is used, the whole process, as described and claimed in my separate application filed even date herewith for United States Letters Patent on an improved process for uniting two metals, producing economically a rail-bond that renders very effective service.

The advantages of this flux over those heretofore used for uniting copper and steel, in view of the characteristics and modes of application hereinbefore described, may be briefly summarized as follows: greater ease of preparation and application, smaller cost of the quantity necessary to give efficient service, and a more intimate and complete weld obtained between the copper and steel.

Other modes of applying the principle of my invention may be employed instead of the

one explained, change being made as regards the means herein disclosed, provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention—

1. An improved flux for uniting metals containing phosphorus.

2. An improved flux for uniting metals containing red phosphorus.

3. An improved flux for uniting metals containing phosphorus and an acid.

4. An improved flux for uniting metals containing phosphorus and muriatic acid.

5. An improved flux for uniting metals containing red phosphorus and an acid.

6. An improved flux for uniting metals containing red phosphorus and muriatic acid.

Signed by me this 3d day of April, 1903.

WILLIAM H. WHERRY.

Attest:

D. T. DAVIES,

G. W. SAYWELL.