

Device for Coating Articles with Glass, Enamel, Quartz, and Metals—JTST Historical Patent #19*

UNITED STATES PATENT OFFICE

1,617,166.

Max Ulrich Schoop, Zurich, Switzerland

Application 13 January 1922, Patented 8 Feb 1927. Serial No. 529,040, and in Switzerland 8 February 1921.

Producing coatings by means of a metallic powder is generally carried out by forcing a mixture of compressed air and a metallic powder through a concentric oxyhydrogen flame, whereby the metallic particles are heated and fused. With substances with a high melting point such as glass, quartz, platinum, tungsten, *etc.*, it has proved advantageous to avoid heating the nitrogen contained in the compressed air that serves as conveying agent to the metallic particles and to use instead of compressed air a compressed gas which burns or sustains the combustion intensively and heats the article to which the coating is to be applied during the coating process. That is to say I use gas substantially free from nitrogen. By this method which forms the subject matter of the present invention it is attained that the particles reach the article to be coated in a plastic or liquid state, whereby the article is not cooled when the coating is produced on it, as is the case in the hitherto known process mentioned above, but is continuously heated. In carrying out the present process, it is assumed that the articles to be coated will stand temperatures which are not materially different from those of the melting points of glass, enamel, or the like.

In applying a coating of enamel or glass it must be borne in mind that the flame used in heating or preheating the article must act as a reducing agent as otherwise intimate contact between the article and the coating is not ensured.

The accompanying drawing illustrates a constructional example of a device for carrying into effect the process according to the invention. In this drawing:

Fig. 1 is a vertical longitudinal section through the device.

Fig. 2 is an end view of a stop valve with parts being shown in the section.

Fig. 3 is a general arrangement view of the device.

The material to be used for coating, for instance pulverulent copper, is enclosed in a receptacle **1** into which a compressed gas, for instance oxygen or hydrogen, is introduced by means of a conduit **2**; the pulverulent copper is stirred and forced through the channel **3** into the nozzle **4**. The current of compressed gas used for conveying the material is controlled by means of a regulating screw **5** being screwed into the nipple **6**. The gas current passes through the opening **7** provided in the regulating screw **5** and enters the chamber **9** by means of four apertures **8**; it is then forced from the chamber **9** through the annular gap **10** into re-

ceptacle **1**. The width of the gap **10** may be adjusted by turning the regulating screw **5**, whereby the intensity of the gas current can be regulated at will.

In order to attain a uniform supply of the material for producing the coating to the nozzle **4** which material can also be in a liquid state instead of being pulverulent, a sieve **11** is arranged inside the receptacle **1**. **12** denotes a casting made for instance of aluminum, in which a stop cock **13** is arranged. The casting **12** and the stop cock **13** are provided with three bores for the to be passage of gases, oxygen being supplied by means of conduit or hose **14** from a container **26**, a combustible gas, for instance acetylene, illuminating-gas, or hydrogen by hose **15** from a container **27** and a combustible gas being supplied by hose **16** from a container **28**. The gases supplied by the hoses **14** and **15** are conducted into the mixing chamber **17**, from where the mixture of gas passes through the annular channel **18** in order to burn at the end of said channel in the shape of a concentric, very hot flame. Channel **18** is formed by the nozzles **4** and **19**. The combustible gas supplied between the hose **16** passes through the annular channel **20** which is formed between the nozzles **19** and **21**. For the sake of clearness, the section illustrating the connection between the hose **16** and the annular channel **20** in the casting **12** (Fig. 1) is not a vertical section but a radial section turned into the vertical. The two nozzles **21** and **19** are provided with flanges **24** and **25**, respectively; a throwover nut **22** coacting with said flanges secures the nozzles **19** and **21** to the nozzle carrier **23**. The pulverulent copper conveyed by the current of compressed gas into the nozzle **4** and from there into the flame is intensively heated in said flame and projected against the surface to be coated. The article to be coated is thereby continuously heated so that its surface is preserved against any oxidation during the coating. An effective preheating of the article to be coated is generally advantageous and is necessary when producing coatings of glass, quartz, and enamel. The preheating of the article can be easily effected by means of the device illustrated.

By using a current of gas directed upwardly through the body of pulverulent material I obtain the novel result of carrying in the gas stream only the finer particles of the pulverulent material, and effect a thorough stirring of the materials to break up the loosely adhering lumps so that these lumps are separated by gravity and not carried to the outlet valves to clog them.

I claim:

In a device for coating articles, particularly with glass, enamel, quartz, metals and the like, a receptacle for the pulverulent coating material, adjustable means arranged at the bottom of said receptacle for admitting a stream of compressed com-

*This series of historical patents concerned with thermal spray technology has been compiled by C.C. Berndt (SUNY at Stony Brook, NY) and K.A. Kowalsky (Flame-Spray Industries, Inc., NY).

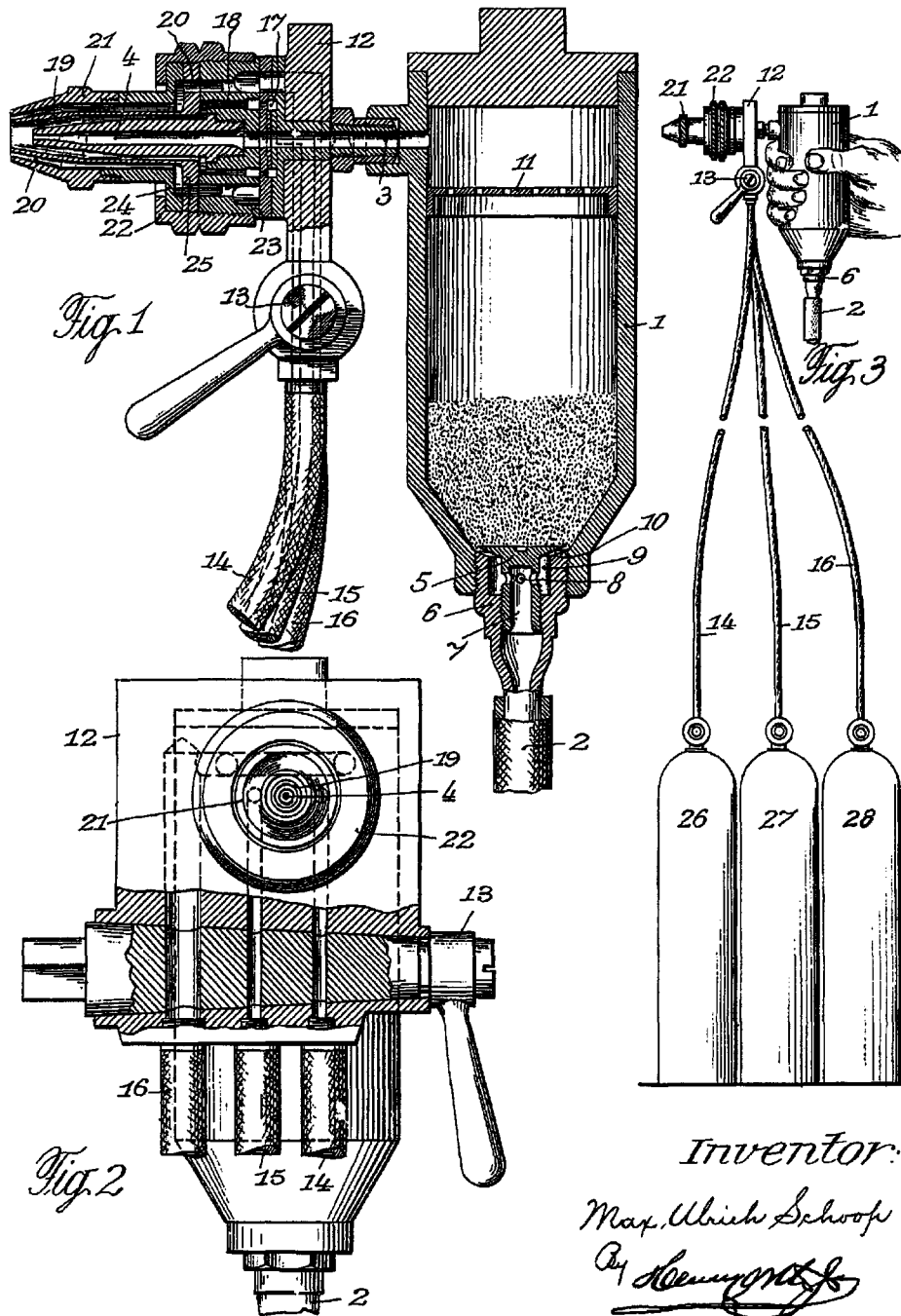
Feb. 8, 1927.

M. U. SCHOOP

1,617,166

DEVICE FOR COATING ARTICLES WITH GLASS, ENAMEL, QUARTZ, AND METALS

Filed Jan. 13, 1922



Inventor:

Max Ulrich Schoop

By *[Signature]*

Att'y.

bustible gas, nozzle means, means for supplying oxygen and two combustible gases to said nozzle means for producing a blow-pipe flame, means connected to the top of said receptacle for conveying the stream of gas and the material suspended therein to said nozzle means for projecting the material, the particles of which are heated to a high temperature by the combustion of the

conveying agent, to the article to be coated, and baffle means provided above the body of material in said receptacle for attaining a uniform suspension.

Max Ulrich Schoop

In testimony whereof I affix my signature.

M. U. SCHOOP