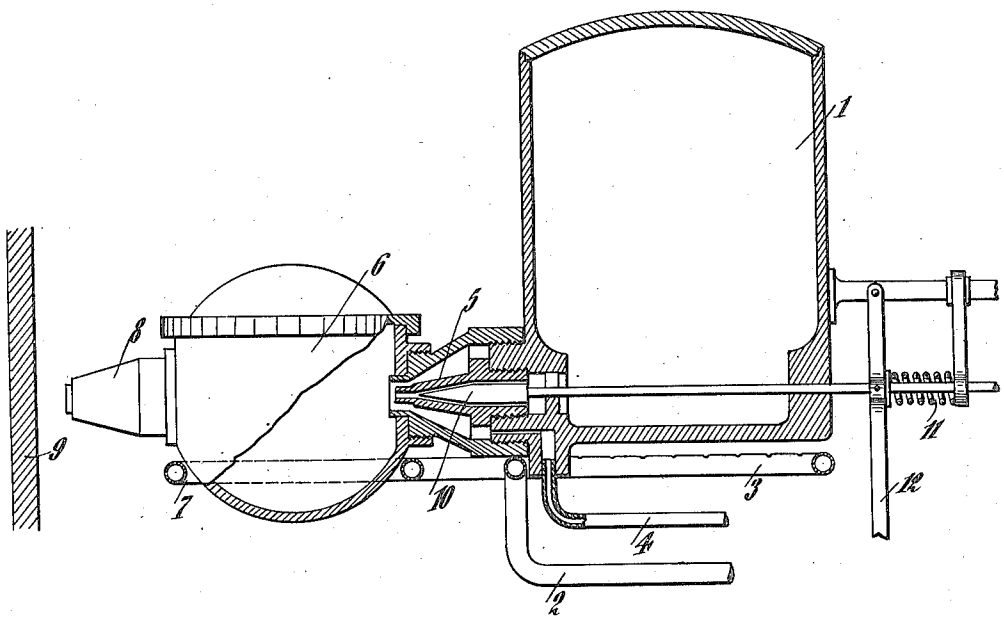
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PROCESS FOR MAKING COATINGS OF FUSIBLE SUBSTANCES.

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1,221,104. Patented Apr. 3, 1917.



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PROCESS FOR MAKING COATINGS OF FUSIBLE SUBSTANCES.

1,221,104. Specification of Letters Patent. Patented Apr. 3, 1917.

Application filed October 7, 1913. Serial No. 793,934.

To all whom it may concern:

Be it known that I, GEORG STOLLE, a citizen of the German Empire, residing at Berlin-Schöneberg, in the Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Processes for Making Coatings of Fusible Substances; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Processes are already known for making coatings of glass, metal or other fusible substances, in which pulverulent or liquid atomized metal is thrown on to the bodies to be coated, a neutral gaseous pressure-medium being employed. In this method of treatment the kinetic energy released by the blast is mainly employed for producing the covering or coating. In consequence of its ballistic action, an adhesion of the individual particles of the coating material to the foundation is obtained, which in many cases appears sufficient. However, especially since the material reaches the foundation in a molten and also cooled condition, only those parts of the surface are coated, which are subjected to the action of the jet itself.

In this case there can be no question of any special thermal action.

According to the present invention a process is provided which is distinguished by advantages arising in this particular manner. It has been found that a far better action results, yielding a substantially denser coating, which better adheres to the foundation, if the coating material in a solid, liquid, or pulverulent form be converted wholly or at all events mainly, into a gaseous condition and thus applied to the article. This improved thermal treatment has two substantially useful results as a consequence.

First, in consequence of the vaporizing operation, the sub-division of the material is successively finer than is the case when the material reaches the body or article to be coated exclusively in a molten condition. Again this fine automatic sub-division produces not only a coating, but also a penetration into the pores and finest crevices of the foundation, and even the thinnest structural parts of the foundation, for example fibers, are uniformly coated on all sides somewhat as if they had been wrapped or wound with the coating material.

The second substantial effect is based on the circumstance that in the process forming the object of the invention, there is mainly obtained and utilized not a ballistic but a thermal action, since as soon as the individual particles of the coating material reach the article to be treated they are liquefied and brazed or soldered on, in consequence of giving off their latent heat of vaporization; they thus not only form a brazed or soldered connection among themselves, but also a similar thorough connection with the foundation, since the latent heat is imparted thereto.

Owing to these circumstances, a coating is produced which apart from the features already mentioned has a further advantage over the methods of coating hitherto employed, inasmuch as the coating does not crack or scale off even under considerable alterations of shape, for example, bending.

When the coating is applied by means of a blast in the ordinary manner, it is found that the particles rebound from the surface in a very vigorous manner, thus causing an evolution of dust which is injurious to health and wastes a considerable amount of material. This disadvantage may also be avoided by employing the improved process, as the application can be made purely thermally by exposing the bodies or articles in question to highly heated metal vapor. In general it is indeed found preferable to apply the coating by the simultaneous use of a blast which works with a compressed gas jet and in this way a combination of thermal and ballistic action may be employed. In this case, however, the last mentioned disadvantage will not arise, as the thermal properties of the process predominate.

In employing the process according to this invention, the vaporization may take place before or after the admission to the apparatus for producing the blast.

In order to obtain a necessary temperature for volatilizing the coating substances, an electric arc may be employed, or any suitable arrangement of known kind. In its place an oxy-hydrogen blast may be employed with advantage as the source of heat.

In case the volatilization takes place directly after the emergence from the atomizing device, which action generally takes place through a nozzle, quartz is preferably selected for the superheater, which in this case is advantageously combined with the

nozzle, as quartz offers the greatest security of working for such a purpose. The nozzle extends close up to the articles to be treated, in order to maintain the coating material in a perfectly volatilized condition and thus to enable it to reach the foundation in this condition.

While it is particularly noted, the process may be carried out in several ways and with many different forms of apparatus, I illustrate one form of the apparatus by way of example.

The figure is a longitudinal vertical sectional view partly in elevation.

Reference numeral 1 designates a container which is heated by a heating coil 3 fed by the gas conduit 2 and wherein the fused spraying material may be located. From that container the material to be sprayed is conveyed through the nozzle or atomizing device 5, under the action of a gaseous pressure means fed through the pipe 4, into another container 6 the interior of which is heated from an outside source 7 up to the temperature required to vaporize the material contained therein. This container is provided with an outlet nozzle 8 which can be shut off and regulated through which the material, vaporized by the heating device 7 is sprayed upon the blank 9. For that purpose use is made also of the compressed gases which force the fused material into the container 6. Obviously however other pressure means may be used for feeding the metallic vapors. Moreover, a pin 10 penetrates into the nozzle 5 which pin is movable lengthwise by means of a lever 12 which swings against a spring 11, whereby the outlet opening of the nozzle 5 may be either increased or decreased and from where any metal that may stick thereto can be removed.

Apparatus suitable for carrying out this process is described and claimed in my co-pending application Serial Number 842,410, filed June 2, 1914, and an analogous process in my application Serial Number 855,691, filed Aug. 7, 1914.

I declare that what I claim is:—

1. The process for coating an object with a fusible coating, which comprises volatilizing a coating material and projecting said volatilized coating material against the surface of the object by means of a compressed inert gas.

2. The process for coating an object with a fusible coating, which comprises volatilizing a coating material and projecting with violent impact said volatilized coating material against the surface of the object by means of a compressed inert gas.

3. The process for coating an object with a fusible coating, which comprises partially volatilizing a coating material and projecting said volatilized coating material against the surface of the object by means of a compressed inert gas.

4. The process for coating an object with a fusible coating, which comprises simultaneously projecting volatilized coating material and a compressed inert gas mixed therewith against the object to be coated.

5. The process for coating an object with a fusible coating which comprises simultaneously and violently projecting volatilized coating material and a compressed inert gas mixed therewith against the object to be coated.

6. The process for coating an object with a fusible coating, which comprises simultaneously projecting volatilized coating material and a compressed inert gas mixed therewith against the object to be coated while the object is entirely open to the outside atmosphere.

7. The process of coating an object with a fusible coating, which comprises superheating a blast containing said coating material in the atomized form until at least the greater part of said material is volatilized, and directing said superheated blast to the surface of the object.

8. The process of coating an object with a fusible coating, which comprises blowing said material through a jet in a finely divided form, superheating said blast to a sufficiently high temperature to volatilize said material, and directing the superheated blast upon the surface of the object which is placed close to the exit of the superheater.

In testimony whereof I affix my signature, in presence of two witnesses.

GEORG STOLLE.

Witnesses:

ALBRECHT MÜLLER,

CLAUDIUS HINZ.