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COATING WITH FUSIBLE MATERIAL.

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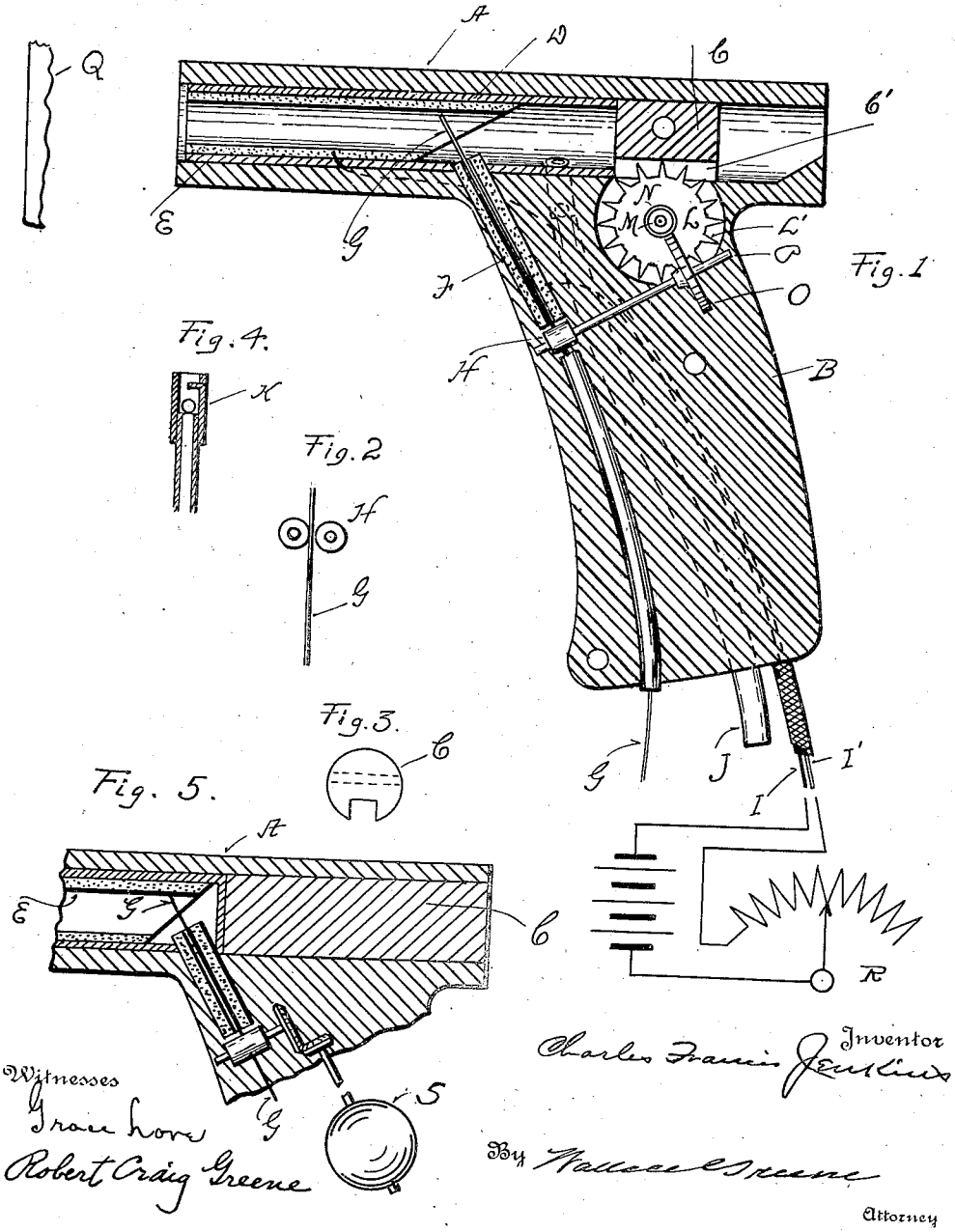


Fig. 1

Fig. 4.

Fig. 2

Fig. 3.

Fig. 5.

Witnesses

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To all whom it may concern:

Be it known that I, CHARLES FRANCIS JENKINS, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Coating with Fusible Material, of which the following is a specification, reference being had therein to the accompanying drawing.

The general object of this invention is to coat metallic or other articles with metal or other fusible material, and this object is attained by fusing the coating material and driving small particles thereof against the object to be coated at a very high velocity.

In the specific embodiment of the invention selected for illustration a metallic wire is fused by an electric current and thrown, in small particles, violently against the surface to be coated, the arrangement being such that the fused metal comes in contact with nothing likely to quickly oxidize it or otherwise chemically change its character.

In the accompanying drawings, Figure 1 is an axial section of a pistol-like device for carrying out the process above suggested. Fig. 2 is detached view of feed rollers seen in Fig. 1. Fig. 3 is an end view of a plug shown also in Fig. 1. Fig. 4 is a sectional view of a check valve shown in dotted lines in Fig. 1. In Fig. 5 is a partial sectional view showing a modified construction, the plane of section being axial as in Fig. 1.

In these figures, A represents the barrel and B the handle of a pistol-like frame carrying various working parts of the device.

The part A has an internal passage extending from end to end, preferably upwardly inclined at the rear, and obstructed near its rear end by a strong fixed plug C which is grooved along its lower side as shown at C'. The forward portion of the passage is preferably provided with a lining sleeve D of heat and electrically insulating material, and within this lining fits a hollow cylinder E of carbon having its rear end portion cut obliquely so that its lower side is materially shorter than its upper portion. The handle is provided with a passage opening into the barrel passage below the overhanging part of the cylinder E, and in the upper part of this passage is fixed a long axially perforated carbon block F through which is fed a small wire or rod G of the coating metal, the feeding being done by rollers as hereinafter set forth. Conductors I, I' brought in a flexible cable from any suitable source of electric current, pass into the handle and to the cylinder E and block F, respectively. A flexible tube J enters the handle and passes to the short space or chamber between the plug C and the rear end of the cylinder E and is provided near its end with a check valve K. This tube delivers or may deliver, any suitable explosive material. I have used oxyhydrogen gas with satisfactory results, but other well known explosives may be used. In the handle is revolubly mounted a gear-like disk L having peripheral wings L' parallel to its axis and fitting in the groove C' in the block C. The shaft M of the disk bears a worm N which engages a gear O fixed to the shaft P of one of the feed rollers H.

If this device be directed toward any object to be coated, and at any suitable distance therefrom, while connected with proper sources of supply of current and fuel under light pressure, advancing the rod G into contact with the cylinder E completes circuit, and the rod being relatively small the part within the passage in the barrel carries the entire current unaided, with the result of instant fusion and, if the current be adequate to produce such result, partial and explosive conversion into gas. At the same moment, the fuel in the rear of the rod is exploded, the check valve K is automatically closed and the fused and nonvolatilized portion of the metal is converted into small particles and thrown with extremely high velocity against the object Q to be coated, the velocity of course depending upon the character of the explosive actions, or the intensity of the current and the kind of fuel supplied. A small part of the pressure created drives matter rearward in the groove C' against the wings L' and thus rotates the feed rollers and advances the rod G again into contact with the cylinder E, and thus the described cycle of operations is repeated rapidly and indefinitely. When the object to be coated is clean metal and the coating rod is also of metal or of any combination of metals, the object may thus be provided with a coating of any desired thickness apparently integral with the

metal of the object, the particles of coating metal uniting with the metal of the object and with each other.

When the object is non-metallic and porous, whether of wood, paper, lace, or other textile fabric, it may be metallized to any desired degree. For example, the innumerable particles of metal may be driven into the pores of the object so as to give it a slight metallic tinge without changing its obvious character as wood, paper, etc., or the article may be provided with a full metallic covering, the difference in result depending simply upon the time during which the object is exposed to the blast of metallic particles.

When the coating is applied to a non-porous object with which the metal cannot integrally unite it will still adhere during its formation and the film so formed may be stripped from the surface and will present a counterpart of any intaglio or relief design upon that surface.

With proper proportion of the parts, it is quite possible to obtain good results without admitting explosive, but relying wholly upon the explosive character of the partial volatilization of the metal, but in this case it is desirable to have only a small space in the rear of the rod or wire; and it is equally possible to use a current which causes no appreciable volatilization, if explosive material be used as first set forth.

Since it is desirable to have the space in the rear of the wire small in case no fuel is admitted and since I may wish to feed the wire G without using the explosive force generated by explosion, I have shown in Fig. 5 a construction in which the space in the rear of the wire is less than in Fig. 1 and the feed rollers are rotated by geared connection with a small electric motor S, and there is no rearward opening from the explosion chamber. This construction is preferred over using the form of Fig. 1 and omitting the supply of explosive material, supplied by the pipe J.

It is to be noted that the wire as it is melted by the current is in contact with carbon or non-metallic material only and that no welding can occur. And it may also be mentioned that while the heat generated is of high intensity it is small in quantity and is rapidly dissipated.

What I claim is:

1. The method of coating objects with fusible material which consists in suddenly fusing and in part volatilizing the coating material and applying the expansive force of the volatilized part to violently projecting the non-volatilized part against the surface to be coated.

2. The method of coating objects with fusible material which consists in electrically fusing the material through its resistance to the passage of an electric current and throwing innumerable particles thereof with very high velocity against the object to be coated.

3. The method of metallizing porous non-metallic bodies which consists in electrically fusing the coating metal through its resistance to the passage of an electric current, dividing it into extremelv small particles while fluid, and driving these particles with extremely high velocity against the body to be coated or metallized.

4. The method of coating articles with fusible material which consists in fusing the coating material and driving minute particles thereof against the article to be coated by the explosive action of explosive agents.

5. The method of coating with metal which consists in fusing small quantities of the coating metal successively, and by the successive actions of highly explosive agents driving minute particles of each small quantity against the surface to be coated.

6. The method of coating objects with fusible material which consists in fusing a small portion of the coating material by an electric current and violently projecting numerous particles of the fused material against the object to be coated by means of an explosion caused by the heated coating material itself.

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

CHARLES FRANCIS JENKINS.

Witnesses:
JAMES L. CRAWFORD,
ROBERT CRAIG GREENE.