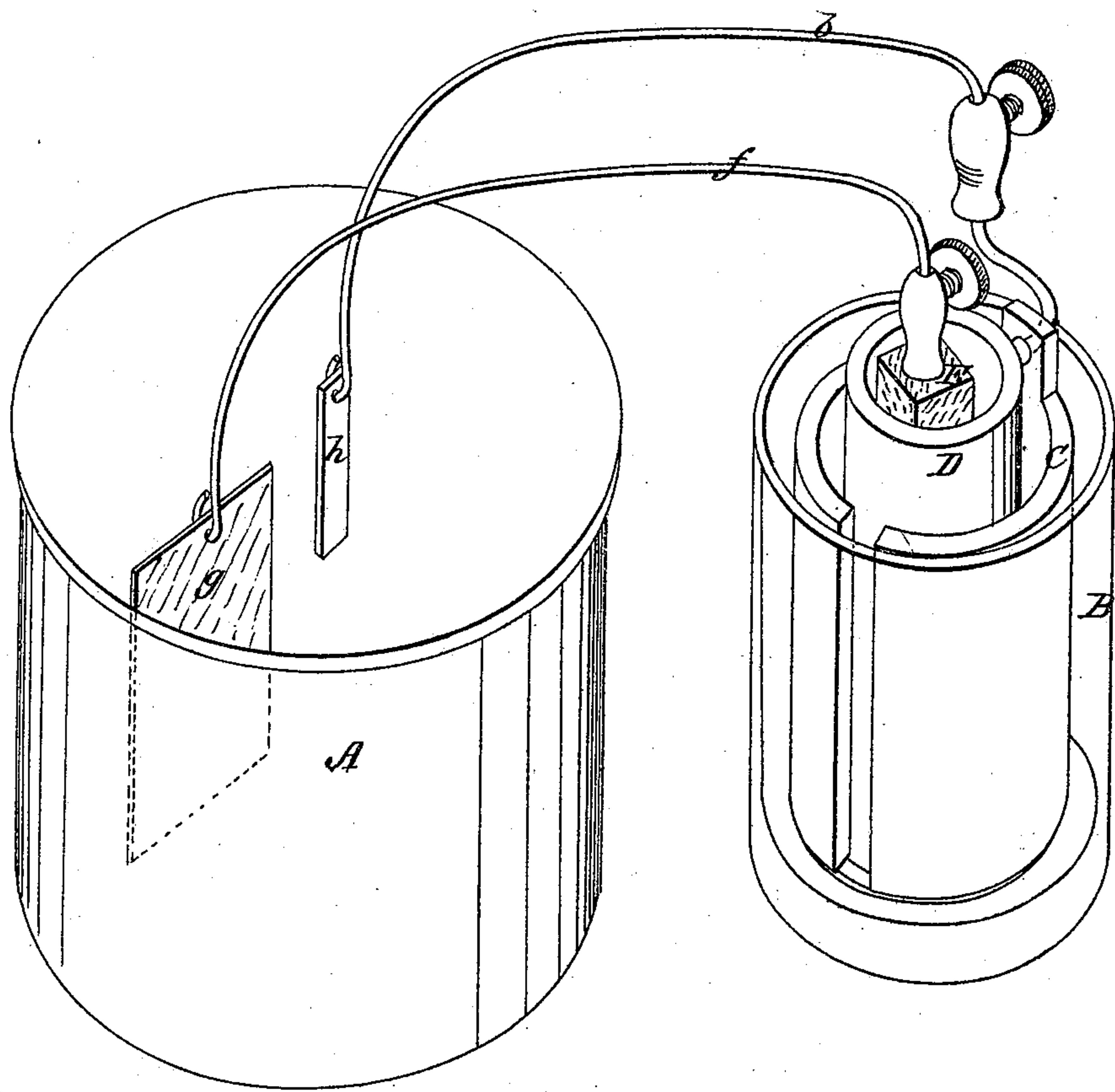


J. E. WALCOTT.
ELECTROPLATING IRON WITH COPPER.

No. 34,470.

Patented Feb. 18, 1862.



Witnesses:

Chas. R. Roach
Edmund Mason

Inventor:

J. E. Walcott

UNITED STATES PATENT OFFICE.

JABEZ E. WALCOTT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO WILLIAM HOOPER BLACKLER, OF SAME PLACE.

IMPROVEMENT IN PROCESS OF ELECTROPLATING IRON AND OTHER METALS WITH COPPER.

Specification forming part of Letters Patent No. 34,470, dated February 18, 1862.

To all whom it may concern:

Be it known that I, JABEZ E. WALCOTT, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and Improved Process of Electroplating with Copper, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, making part of this specification, in which is represented the apparatus which I employ in carrying out my invention.

Where sulphate of copper is employed for the purpose of electroplating with copper, if the metal (iron for example) be soluble in sulphuric acid it will be corroded by the acid and the copper will not adhere to it; but even with metals that are not liable to be corroded by the acid the process is an exceedingly slow one, and in consequence very expensive.

For the purpose of plating iron with copper in order to secure the adhesion of the two metals and to prevent the corrosion of the iron, it has heretofore been necessary to employ a solution composed of a mixture of cyanide copper and cyanide of potassa; but this process is without any practical utility in the arts, first, on account of its great expense; secondly, on account of the poisonous fumes which are given off while it is going on, and which are very deleterious to the health of the operatives. A process, therefore, by which copper may be deposited upon and made to adhere to the surface of iron and other metals soluble in sulphuric acid without the use of sulphate or of cyanide of copper, and which shall be less expensive than where either of these substances is used, and also free from the poisonous effects before spoken of, is a great desideratum in the arts. This desideratum is attained and the before-mentioned inconveniences, as well as the great expense heretofore incurred, are avoided by my improved process, which I will now proceed more particularly to describe.

I am aware that a weak solution of cyanide of potassa in water, in connection with a galvanic current, has been employed for the purpose of plating with silver and some of the other metals; but such process has proved entirely inapplicable and unavailing for the purpose of plating iron with copper.

In the course of extensive experiments I

have discovered that by the employment of a solution of fused cyanide of potassa of great strength in connection with a powerful galvanic current I am enabled to plate iron and other metals rapidly and economically with copper without the employment of either sulphate or cyanide of copper and without danger or inconvenience to the workmen.

To enable others skilled in the art to understand my improved process, I will proceed to describe the manner in which I have carried it out.

In the accompanying drawing, A is a vessel of glass or of any other suitable material which will not suffer decomposition when brought in contact with the agents employed and will permit the contained solution to be warmed. This vessel I partially fill with a strong solution of cyanide of potassa, two pounds or thereabout being dissolved in one gallon of water, the temperature of the solution being raised to about 150° Fahrenheit. Into this bath I introduce the two poles of a galvanic battery of sufficient strength to do the work. As this depends in a measure on the size of the bath and of the articles to be plated, no definite rule as to the strength of the current can be given for all cases; but a very strong current being required I use a Bunsen battery, as represented in the drawing, in which B is a glass vessel containing sulphuric acid and water; C, the zinc to which is attached a copper wire, *b*. Within the zinc cylinder C is placed the porous cup D, which is partially filled with nitric acid, and into which is introduced a block, E, of carbon. To this block is connected another copper wire, *f*, to which is attached a large plate of copper, *g*, (the anode,) and to the wire *b* is attached the iron cathode *h*. The battery now being in operation, the copper plate *g* and the iron plate *h* are both inserted into the bath in the vessel A, when, by the action of the galvanic current, the copper of the plate *g* is dissolved off. This action is permitted to go on until the solution in the vessel A is sufficiently saturated with copper, which will be indicated by a good deposit of copper on the iron plate *h*. The article to be plated is now introduced into the bath A in contact with the pole *b* of the battery, when the copper is deposited upon it, the

supply of copper being kept up in the bath by being dissolved off from the plate *g*. The operation may thus be continued uninterruptedly until the article being operated upon has been plated to the required thickness with copper.

The strength of the current required to commence the deposition of the copper upon the iron will depend upon the amount of surface to be coated. In general four Bunsen cups of one pint capacity are required to commence the deposition of the copper upon a surface of one square foot of iron. After the iron is once coated with copper and the deposition becomes one of copper upon copper it is simply necessary that the surface of zinc in the battery be about equal to the surface on which the deposit is being made. Were a less-powerful current employed at the commencement of the operation the copper which would be deposited would not adhere to the iron.

The important result which I have attained consists in the fact that the copper deposited by my process adheres as firmly to the iron as in any of the previously-known processes, while the cost of the operation is so reduced and the operation is so divested of any deleterious effects upon the workmen that it can be made of practical value in the arts.

This process may be employed in depositing copper upon other substances than iron, but is particularly advantageous and economical in plating iron with copper.

What I claim as my invention, and desire to secure by Letters Patent, is—

The above-described process of electroplating with copper, substantially as described.

J. E. WALCOTT.

Witnesses:

THOS. R. ROACH,
EDMUND MASSON.