

(No Model.)

T. W. COLLINS.

PROCESS OF FASTENING DIAMONDS IN TOOLS.

No. 299,055.

Patented May 20, 1884.

Fig. 1.

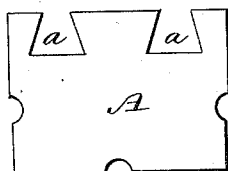


Fig. 2.

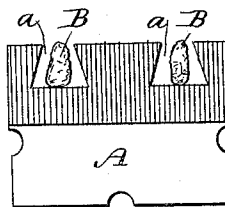


Fig. 3.

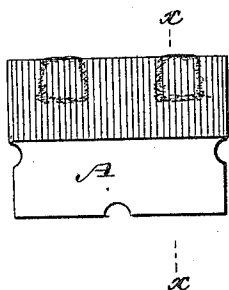
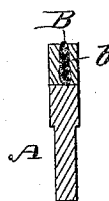


Fig. 4.



WITNESSES:

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PROCESS OF FASTENING DIAMONDS IN TOOLS.

SPECIFICATION forming part of Letters Patent No. 299,055, dated May 20, 1884.

Application filed June 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS W. COLLINS, of the city, county, and State of New York, have invented certain new and useful Improvements in the Process of Fastening Diamonds, &c., in Tools, of which the following is a full, clear, and exact description.

The object of my invention is to provide certain new and useful improvements in fastening diamonds and other analogous substances in the edges and surfaces of abrading and cutting tools—such as stone-saws, rock-drills, &c.

The invention consists in securing or fastening diamonds in tools by means of metal deposited by electricity around the diamond and the adjoining parts of the tool, which deposited metal holds the diamond in place securely in the tool.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side view of a saw-tooth notched for receiving the diamonds. Fig. 2 is a side view of the same showing the covered diamond in the notches. Fig. 3 is a side view of the same showing the diamonds and the teeth united by means of an electric deposit. Fig. 4 is a cross-sectional view on the line $x x$, Fig. 3.

The saw-tooth a or other tool in which the diamond or analogous substance is to be held is provided with a notch for each diamond, the said notches preferably being made dovetailed. Those parts of the tool around the notches are provided with a coating of copper or other metal or alloy by means of an electric bath. The diamonds B are each provided with a metal coating, b , in an electric bath; but diamonds, being non-conductors, have to be specially treated to make them receive a metallic deposit. This is accomplished by either of the following processes:

First. The diamond is first dipped in a solution of phosphorus and bisulphide of carbon and dried in the atmosphere, when the liquid of the solution will be evaporated. It is then placed in a solution of nitrate of silver and allowed to remain therein until it becomes black, when it is removed from the silver solu-

tion and dried in the air. When dry, it is washed in clean water and placed in a solution of chloride of gold for a few moments, dried as before, then washed in clean water and placed in the electric bath to receive its final coating of metal. The solution of chloride of gold may in some cases be dispensed with.

Second. The diamond is first placed in the bisulphide of carbon and phosphorus and dried. It is then placed in a solution of nitrate of mercury, washed and dried, after which it is immersed in a strong solution of sulphate of copper in contact with metallic iron, when the non-conducting surface will be almost instantly covered with a thin coating of metallic copper.

It is evident that the above processes are equally applicable for rendering all non-conducting substances conducting. The diamonds thus coated are placed in the notches a and the saw-tooth is then placed in a metal-solution bath, and metal is deposited on the tool and the coated diamond by means of an electric current. The metal thus deposited rapidly fills in the spaces between the diamond and the edges of the notches, and thus unites the metal covering on the diamonds with the metal covering on the tooth, so that the metal in which the diamonds are held and the coating on the tooth will become an integral mass. The diamonds are held very firmly and securely, and are always held firmly whether the saw runs in one direction only or forward and backward. Diamonds can be held in all kinds of cutting or abrading tools in the manner described. Other hard precious stones—corundum, or emery, diamond-steel, &c.—can be held in tools in the manner described. If desired, several small diamonds may be united to form one cluster, which is then placed in a notch, a , and held in the same in the manner described.

I do not abandon or dedicate to the public any patentable feature set forth herein and not hereinafter claimed, but reserve the right to claim the same, either in a reissue of any patent that may be granted upon this application or in other applications for Letters Patent that I may make.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

- 5 1. The method of fastening diamonds or analogous substances in tools, consisting in providing the diamonds with a metal coating, placing the coated diamonds in notches in the tool, and then uniting the coated diamonds and the tool by means of electric deposits of metal, substantially as herein shown and described.
- 10 2. The method of fastening diamonds or analogous stones in tools, consisting in providing the diamond with a metal covering by

means of metal deposited by electricity, depositing metal around the notches in the tool by electricity, then placing the coated diamonds in said notches, and then depositing metal in the notches and on the diamond and the tool, and thus uniting the covered diamonds and the tool, substantially as set forth and described.

THOS. W. COLLINS.

Witnesses:

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