

W. McKENNA.
Setting Diamonds or Carbon Points in the Face of
Metal Tools.

No. 143,021.

Patented September 23, 1873.

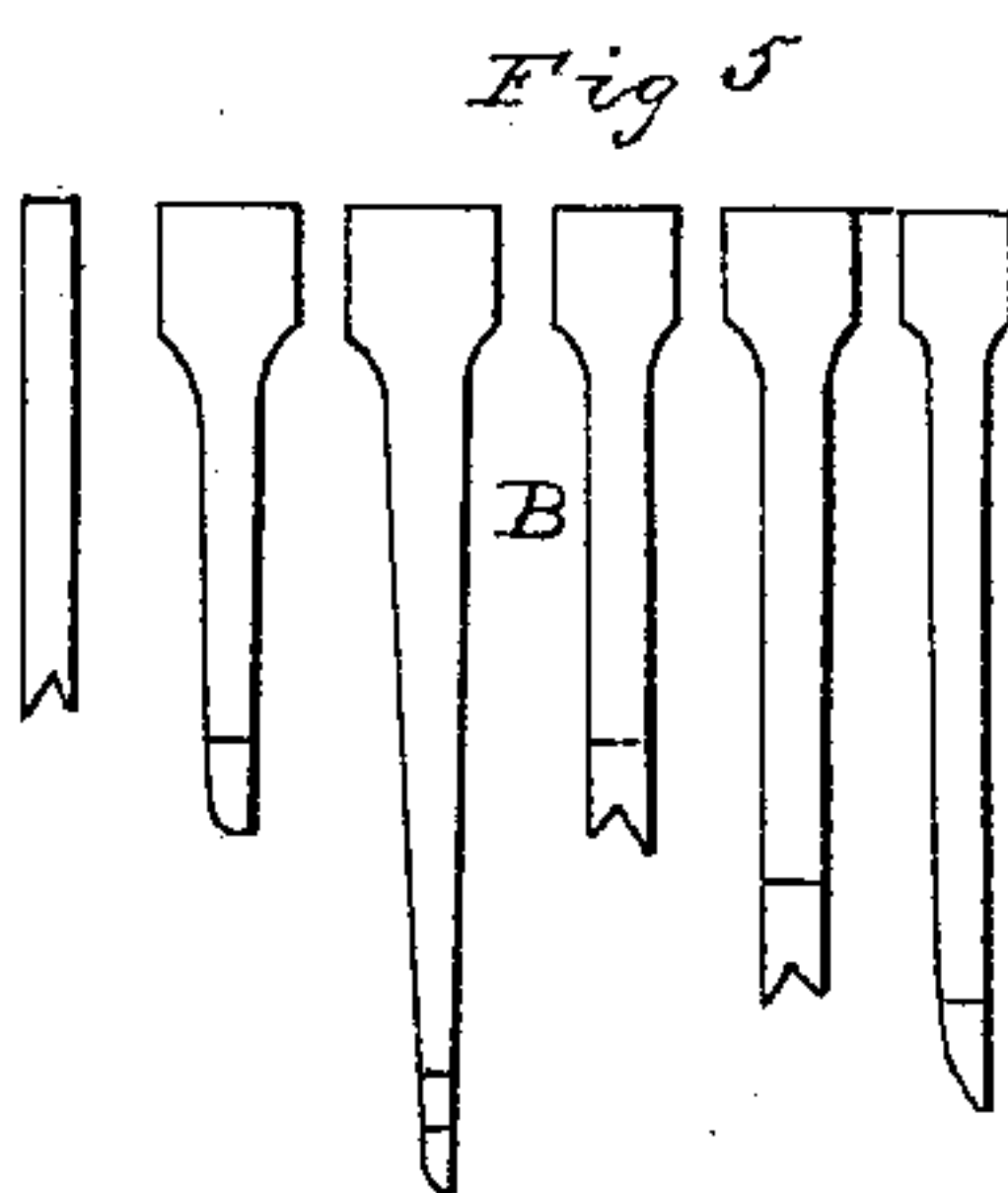
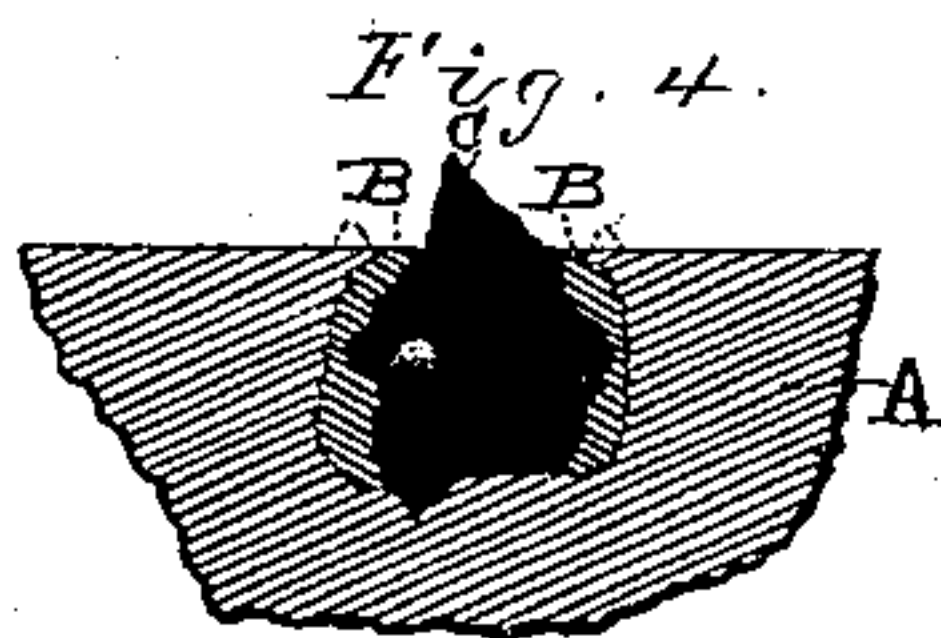
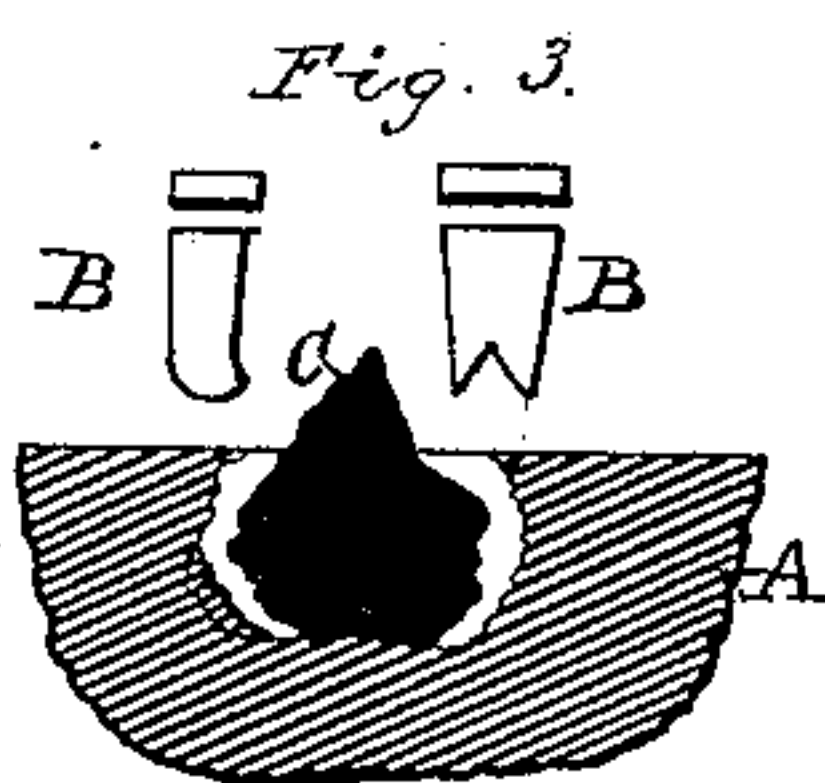
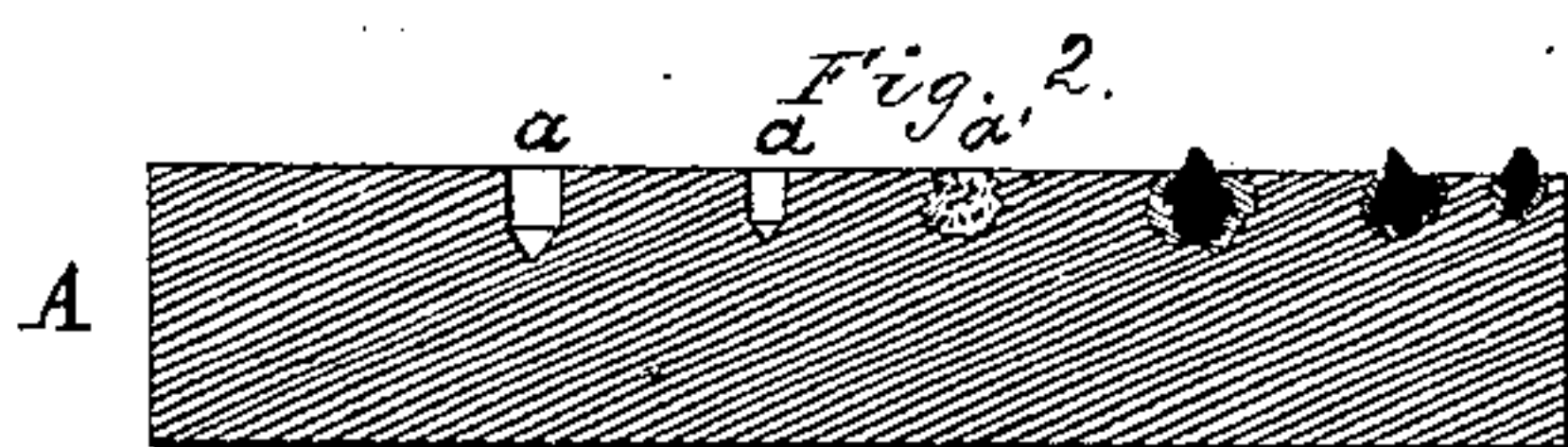
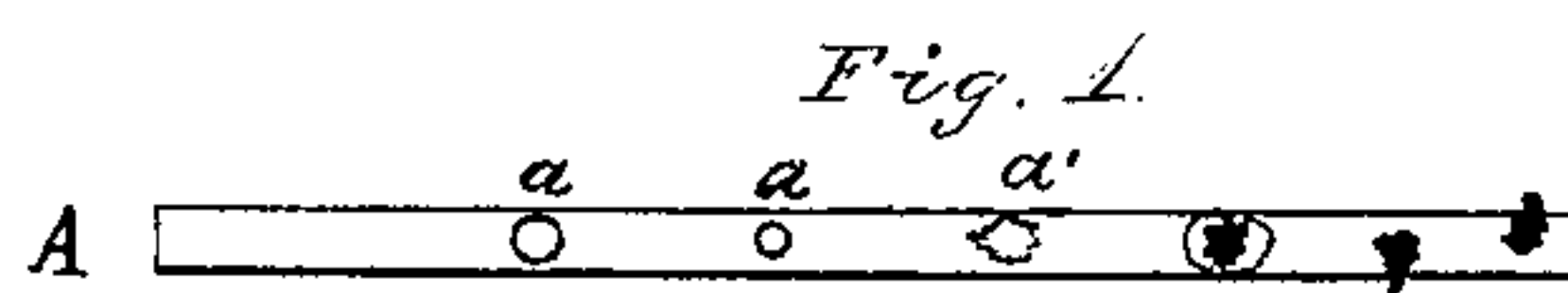
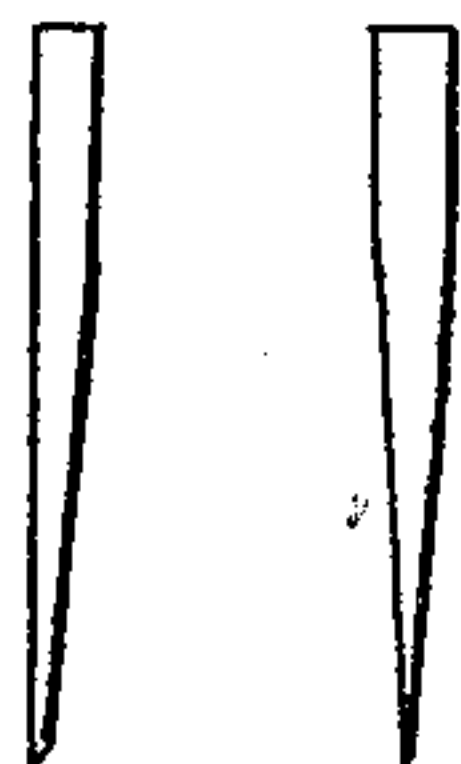


Fig. 6.



WITNESSES.

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IMPROVEMENT IN SETTING DIAMONDS OR CARBON POINTS IN THE FACES OF METAL TOOLS.

Specification forming part of Letters Patent No. **143,021**, dated September 23, 1873; application filed March 26, 1873.

To all whom it may concern:

Be it known that I, WILLIAM McKENNA, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful improved Method of Setting Diamond or Carbon Points in Metal Tools; 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 pertains to make and use it, reference being had to the accompanying drawings which form part of this specification.

My invention relates to the setting of diamond or carbon points in the faces of metal tools used for cutting and dressing stone, drilling rock, and other like purposes. Heretofore the great obstruction to the utilization of the exceedingly hard property of the diamond or carbon point in the useful arts, as a means of drilling rock, sawing and dressing stone, &c., has been the constant tendency of the points to work loose in their sockets, and drop out, or become detached from the tool in the face of which they are set. The diamonds, being small, are apt to be lost amongst the debris of the quarry when they become detached from the stone saw or plane. And when a loose diamond comes in contact with the other points of a diamond drill or other tool in rapid motion the friction of the one diamond on the others results in their mutual destruction. In any case the loss of one or more points from the face of the tool is a cause of great loss, not only of the diamonds themselves, but in the time and labor necessary in resetting. So much so is this the case that those skilled in the art are well aware that, unless the diamonds can be so set as to render it impossible for them to work loose in their setting, this valuable mineral can never be profitably used in the arts as a cutting edge or points for tools. My invention is designed to obviate this difficulty; and the invention consists in a new and improved method for setting or resetting diamonds or carbon points in metal tools, whereby all tendency to work loose or drop out is entirely obviated.

In the accompanying drawings, Figure 1 is a plan view of a portion of a stone-saw, showing the different stages in the process of setting the diamonds therein. Fig. 2 is a vertical

section of the same. Fig. 3 is an enlarged sectional view, showing the form of socket and shape of wedges for securing the diamond therein. Fig. 4 is a sectional view, showing the relative position of the wedges, the diamond, and the metal of the tool when the operation of setting is completed. Fig. 5 shows wedges of different forms used in setting the diamonds. Fig. 6 shows the form of tools used for removing the diamonds from their setting when necessary.

A represents a portion of a stone-saw, in the face or cutting-edge of which the diamonds or carbon points are to be inserted in the following manner: Holes *a a*, approximating in size to the sizes of the diamonds to be inserted, are first drilled in the face of the saw at suitable distances apart. The diamond to be inserted is then examined with a view to determine, relatively, which portion presents the best cutting-edge, and which the best seat or bearing-surface, the largest end being generally selected for the latter purpose. This being determined, the operator makes an impression of that portion of the diamond which is to be embedded in the metal in a piece of wax or soap, which will show the irregularities of the contour of the diamond. It will also be found convenient to keep the diamond inserted in the soap or wax, with the cutting-point up, so that no mistake is made as to which end is to be secured in the socket. The operator now proceeds to enlarge the hole *a* by chipping out portions of the metal, so as to make the cavity conform, roughly, to the shape of the sides or corners of the diamonds, the cavity being made considerably larger than the diamond. He then takes the diamond by the cutting-point, and, after dipping the under side in soft red lead, or similar adhesive colored substance, inserts it in the hole *a'* until the under end touches the metal, when it is again withdrawn. The object of this is to show where the under surfaces of the diamond come in contact with the metal at the base of the socket, the red lead adhering to the latter at the points of contact. The portions thus marked are then chipped, so as to conform, as near as possible, with the shape of the under side of the diamond, care being taken not to make the cavity too deep, as it is important

that the diamond should rest on a solid bearing, and on the metal of the tool itself.

When the socket *a'* has been thus prepared for the reception of the diamond, the latter is placed therein with the cutting-point up. The diamond is then forced into the metal at the bottom of the socket by striking several slight blows on its point, a copper rod or suitable tool being interposed between the point and the hammer. In this way the under side of the diamond embeds itself solidly in the metal of the tool, leaving irregular wedge-shaped spaces around its sides, as seen by Fig. 3 of the drawings.

B represents wedges made of the best malleable iron, preferably from horseshoe-nails, shaped into the forms shown by Fig. 5. The peculiarities of shape given to the points of the wedges is designed to meet the requirements of the different and irregular forms of the sides of the diamonds and of the cavity of their seat.

The forms shown in the drawings will be found to meet all the requirements of the operator in this respect.

Properly-shaped wedges being selected by the operator, he inserts their points in the space between the sides of the diamond and the metal of the tool, and taps them with vertical blows directed against the straight even heads, thereby forcing the soft malleable iron of the wedges to expand in the direction of the least resistance, and so conform itself to all the inequalities on the surface of the diamond more completely than if it had been inserted in the metal when the latter was in a molten state. When the wedges begin to force back the metal of the tool around the edge of the cavity, they are filed or chipped off close around the diamond. The operator then taps the wedges on the top in a direction diagonally from the diamond, thereby forcing the metal of the wedges against and slightly under the walls of the cavity or metal of the tool, completely filling up all the irregularities in its surface, thereby making the seat of the diamond perfectly solid, the diamond being wedged into the socket on all sides around its circumference. The metal of the tool which had been forced back by the pressure of the

wedges (see dotted lines, Fig. 4,) is now drawn toward the diamond, so as to slightly overlap the outer edges of the wedges, and, being filed smooth, the operation is complete, as shown by Fig. 4 of the drawings, in which A is the metal of the saw, B the wedges, and C the diamond.

Sometimes there are flaws in the diamonds which cannot be detected by inspection, and when such are set in tools by the ordinary process, they remain undetected until the tool is put in operation, when they generally break off and cause much injury to the other diamonds or to the metal of the tool. By my method, the light blows which the diamonds receive when being set in the metal at the bottom of the socket, are a sure means of detecting such imperfections, for though not sufficiently heavy to break a sound diamond, they will cause imperfect ones to break at the flaw, and the broken parts being sound are saved for future use. In this way only sound diamonds are inserted in the tool, and all danger resulting from their breaking is obviated. Another advantage resulting from my method is, that the diamond can be removed by cutting out the wedges without injury to the metal of the tool itself, so that another diamond can be set in the same cavity, or the same diamond can be turned and reset therein, as desired.

Any skilled workman can, by this method, set ten or twelve diamonds in a day's time with a few simple tools, thereby effecting a great saving of time and labor over the methods heretofore in use.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The herein-described method of securing diamonds or carbon points in metal tools by means of wedges made from horseshoe-nails or metal of like quality, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of March, 1873.

WILLIAM MCKENNA.

Witnesses:

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EDM. F. BROWN.