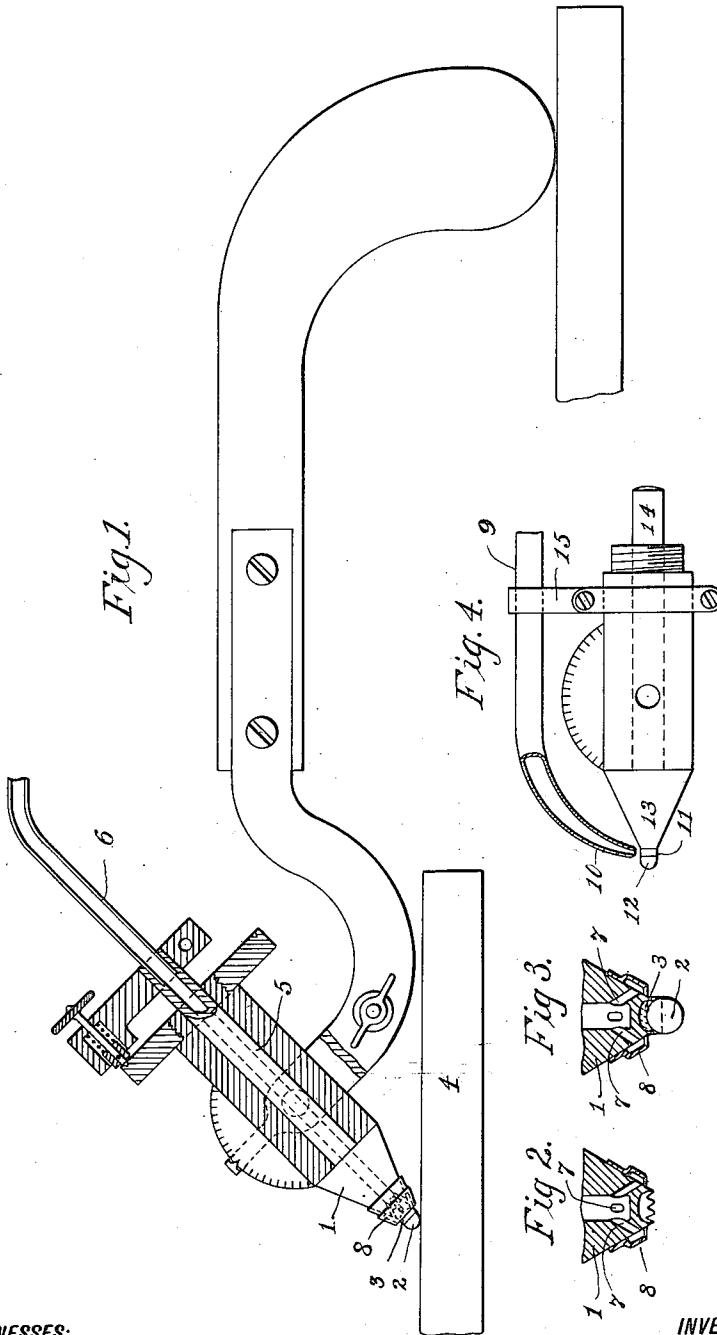


C. J. COLEMAN.
ART OF POLISHING DIAMONDS,
APPLICATION FILED JULY 20, 1912.

1,214,009.

Patented Jan. 30, 1917.

2 SHEETS—SHEET 1.



WITNESSES:

Wm. Ashley Kelly
Victor D. Bonet

INVENTOR

Clyde J. Coleman

BY

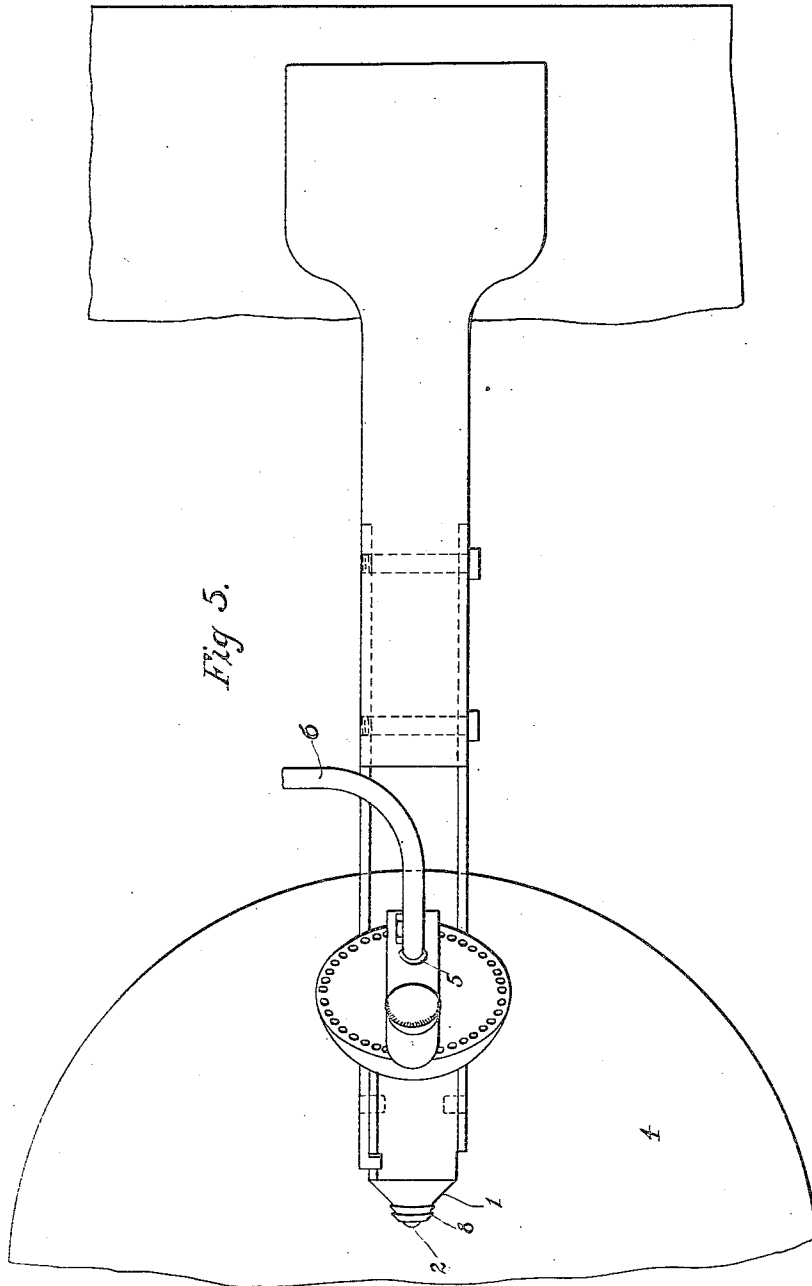
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UNITED STATES PATENT OFFICE.

CLYDE J. COLEMAN, OF NEW ROCHELLE, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO STERN-COLEMAN DIAMOND MACHINE COMPANY, INC., A CORPORATION OF NEW YORK.

ART OF POLISHING DIAMONDS.

1,214,009.

Specification of Letters Patent.

Patented Jan. 30, 1917.

Application filed July 20, 1912. Serial No. 710,623.

To all whom it may concern:

Be it known that I, CLYDE J. COLEMAN, a citizen of the United States, residing at New Rochelle, in the county of Westchester and State of New York, have invented certain new and useful Improvements in the Art of Polishing Diamonds, of which the following is a specification, reference being had therein to the accompanying drawings, forming part thereof.

My invention relates to the art of cutting and polishing diamonds or the abrasive treatment thereof, and relates particularly to holding the diamond while it is being polished.

An object of my invention is to enable the employment of ordinary diamond cutters' cement or of wax or any suitable material for holding a diamond while it is being polished.

Heretofore diamond cutters' cement has been employed to hold a diamond while it is cut, roughly ground out or bruted, and also it has been common to employ wax for holding gem stones other than diamonds during their grinding and polishing, but it has not been possible to employ such simple and convenient holding means for diamonds during the polishing operation because of the fact that the heat generated in the polishing operation would melt the adhesive cement or wax or would expand the diamond loose from the adhesive.

One of the advantages of my invention is that it permits the diamond to be held during the polishing operation by the same cementing material as is ordinarily employed in the cutting, rough grinding or bruting of diamonds, and obviates the present practice of removing the diamond from the arbor employed in bruting and re-attaching and re-centering it on another arbor for polishing.

Another advantage of my invention is that it makes possible an adhesive holding of the diamond during the polishing operation, thereby enabling the diamond to be so held that all parts above or below the girdle of the diamond may be polished without readjusting the diamond in the holder. Moreover, my invention is also capable of use in the cutting or bruting operation, should such operation be so conducted as to tend to develop heat which would impair or destroy

the adhesive properties of the adhesive body holding the diamond.

In general terms, I accomplish the object of my invention by modifying the conditions of operation so as to retain the adhesive properties of the adhesive material employed.

Broadly my invention includes abstracting heat generated in the cutting and polishing operations or in the polishing operation.

More particularly my invention includes means for locally supplying a cooling fluid which absorbs and carries away the heat.

My invention also includes constructive features and combinations of parts of apparatus, as will hereinafter appear.

I shall now describe the construction of the diamond-holding means illustrated in the accompanying drawings and embodying my invention and shall thereafter point out my invention in claims.

Figure 1 is a side elevation, partly in central vertical section, of a diamond holder embodying my invention. Fig. 2 is a central longitudinal section of the tip of the dop head with the cement and diamond omitted. Fig. 3 is a similar view with a diamond cemented in place, as shown also in Fig. 1. Fig. 4 is a side elevation of a dop and its adjuncts embodying a modified construction. Fig. 5 is a plan view of what appears in Fig. 1.

The lower tapered end of the dop head 1 has a cup or socket therein for the reception of the cement and diamond (Figs. 1 and 3), and the edge of this cup is provided with serrations (Fig. 2) for better holding the cement and to facilitate the dissipation of heat. A roughed out or bruted diamond 2 is attached to the dop head 1 by means of a body of adhesive material 3, which may be ordinary diamond cutters' cement or any suitable wax, neither of which under the severe pressure and friction of diamond polishing would withstand the heat generated by such pressure and friction as the diamond is polished by the lap 4. The means provided by the present invention for changing these usual conditions so as to enable the body 3 of comparatively easily fusible cement or wax to retain its adhesion to the dop head 1 and to the diamond 2, are cooling or refrigerating means. The dop head 1 has a tubular stem 5, to the upper

end of which a fluid-conveying duct or pipe 6 is connected for supplying a cooling or refrigerating fluid. The bore of the tubular dop stem 5 is shown as continued into the dop head 1 and the dop head 1 has therein a plurality of fluid-conveying passages 7, indicated in the drawings as four in number, which extend downward and outward from their points of connection or communication with the central bore of the dop, and terminate or open at the outside of the dop head 1 at a point just above the body 3 of adhesive material. A hollow tapered fluid-conveying and fluid-deflecting cap or hood 8 fits in its upper portion closely over the tapered end of the dop head 1 and in its lower portion has inwardly tapered walls surrounding and spaced from the open ends of the passages 7 and provides an annular fluid-directing passage which forms a continuation of the passages 7 and has an annular opening adjacent to the body 3 of adhesive material to direct the stream of cooling fluid into intimate relation and contact with the adhesive body 3 and diamond 2.

The cooling or refrigerating agent employed may be any suitable fluid, such, for example, as refrigerated air, expanding carbon dioxide, or even a sufficient supply of sufficiently rapidly moving air at ordinary atmospheric temperature, may be employed. The supply of cooling or refrigerating fluid may, of course, be obtained from any suitable source thereof connected to the pipe or duct 6, and, in the case of atmospheric air, the air may be forced in around the diamond 2 and cement 3 by atmospheric pressure created by exhausting the air from the pipe 6 to produce an attenuation or rarefaction therein and in the passages 7 and deflecting hood 8 connected therewith.

The stream of cooling or refrigerating fluid, flowing past the readily fusible cement or wax 3 and diamond 2, absorbs and carries away the heat generated by the friction of polishing and prevents either the melting of the cement 3 or the expanding loose therefrom of the diamond 2. The resultant low temperature permits the use of readily fusible cement or wax for holding the diamond on the dop during the heat-generating operation of polishing the diamond.

The holding tool for holding the dop may be of any suitable construction and that illustrated in Figs. 1 and 5 is of a usual form, the construction and use of which will be readily understood by those skilled in the art without the necessity of a particular description thereof.

In the modified construction illustrated in Fig. 4, the cooling or refrigerating fluid flows through a pipe 9 terminating in a nozzle 10 adjacent to and directed toward a body 11 of cement or wax holding a bruted dia-

mond 12 on the tapered end of a dop head 13 having no passages therein and having a non-tubular stem 14. The fluid-conveying pipe 9 and its nozzle 10 are shown as supported on the dop-holding tool by means of a clamp 15.

It is obvious that various modifications may be made in the constructions shown and above particularly described within the principle and scope of my invention.

I claim:

1. The combination of a rotary polishing lap, means for holding a diamond in engagement with the lap to polish the diamond, said means comprising a dop and an adhesive body for adhesively attaching the diamond to the dop, and means for abstracting heat from the adhesive, whereby the adhesive will rigidly hold the diamond during the polishing thereof.

2. The combination of a rotary polishing lap, means for holding a diamond in engagement with the lap to polish the diamond, said means comprising a dop and an adhesive body for adhesively attaching the diamond to the dop, and means for locally applying a cooling gas to the adhesive to abstract heat from the adhesive whereby the adhesive will rigidly hold the diamond during the polishing thereof.

3. Means for holding a diamond during abrasive treatment thereof comprising a diamond, a holder therefor, a body of adhesive material interposed between the holder and the diamond and adhesively attaching the diamond to the holder, and a fluid-conveying duct having an opening adjacent to the adhesive body for circulating a cooling fluid during abrasive treatment of the diamond.

4. Means for holding a diamond during abrasive treatment thereof comprising a dop having a head and a tubular stem, a body of adhesive material adhesively attaching the diamond to the dop head, the dop head having a passage communicating with the interior of the tubular dop stem and terminating adjacent to the body of adhesive material, and a fluid-conveying duct connected to the tubular dop stem, such duct, tubular dop stem and passage constituting means for conveying a cooling fluid to abstract heat developed during abrasive treatment of the diamond.

5. Means for holding a diamond during abrasive treatment thereof comprising a dop having a tapered head and a tubular stem, the tip of the dop head being provided with a cup having a serrated edge and the dop head having therein a plurality of passages communicating with the interior of the tubular dop stem and terminating at the outside of the tapered dop head, an annular deflector surrounding the dop head at the ends of the passages and having an annular opening adjacent to the serrated edge of the

cup of the dop head, and a fluid-conveying duct connected to the tubular dop stem, such duct, tubular dop stem, passages and deflector constituting means for conveying a cooling fluid to a diamond and to an adhesive body by means of which the diamond is attached to the cupped tip of the dop head.

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

CLYDE J. COLEMAN.

Witnesses:

WM. ASHLEY KELLY,
VICTOR D. BORST.