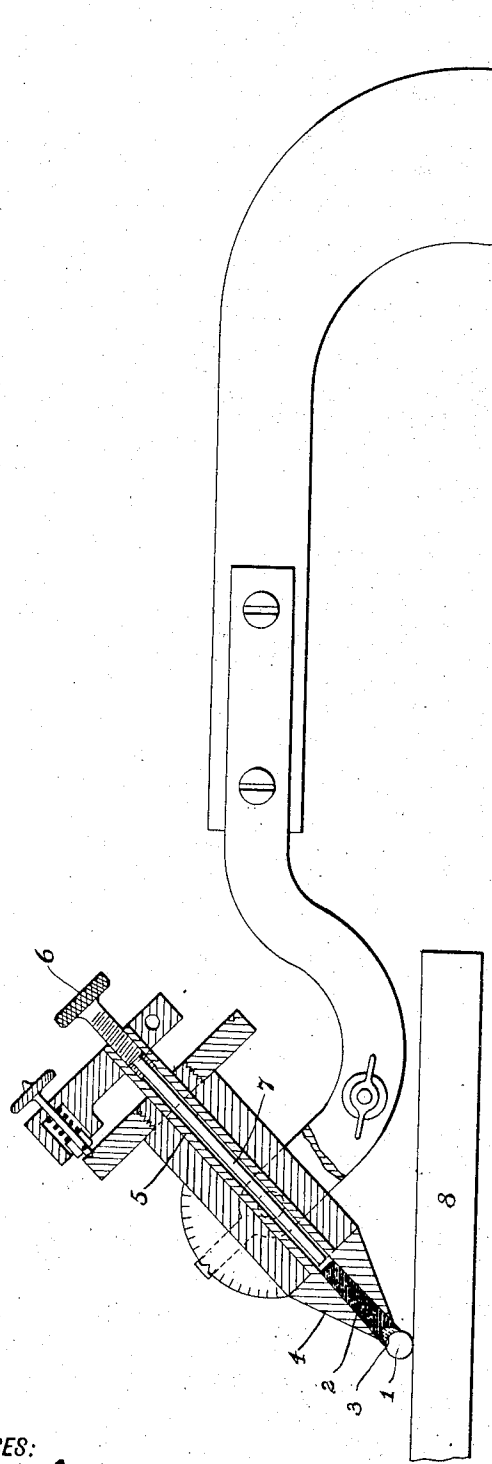
C. J. COLEMAN.

MEANS FOR HOLDING DIAMONDS DURING ABRASIVE TREATMENT.

APPLICATION FILED JULY 20, 1912.

1,329,370.

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WITNESSES:

Wm. Ashley Kelly

Victor D. Bard

INVENTOR

Clyde J. Coleman

BY

Henry B. Williams

ATTORNEY

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.

MEANS FOR HOLDING DIAMONDS DURING ABRASIVE TREATMENT.

1,329,370. Specification of Letters Patent. Patented Feb. 3, 1920.

Application filed July 20, 1912. Serial No. 710,621.

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 a certain new and useful Improvement in Means for Holding Diamonds During Abrasive Treatment, 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 more particularly to means for holding the diamond during the cutting and polishing operations or during the polishing operation. Objects of my invention are to securely hold the diamond with exposure for polishing of all parts above or below the girdle of the diamond, and to save time in attaching and in releasing the diamond from its holder, and to do away, to a large extent, with the skilled manipulation now necessary in diamond polishing operations.

The polishing of diamonds as distinguished from that of other precious stones presents peculiar difficulties because of the extreme hardness of the diamond and because it has to be subjected to great pressure and friction with the result, also, that considerable heat is generated during the polishing operation. Heretofore two general means have been employed for holding the diamond during polishing. The most common of these is to partially embed the diamond in a body of metal in a semi-molten state, contained in a small brass basin or dop, the diamond being matrixed in and held by the metal in which it is embedded, after this metal has cooled. In polishing diamonds in this way, it is necessary from time to time to soften the holding metal and readjust the diamond in order that a different part thereof may be exposed for polishing, and it is not possible to expose at one time all parts of the diamond above or below its girdle. The other diamond-holding means referred to consists of a clamp which is pressed against the stone and locked in position, but this clamping device is very difficult to adjust so as to hold the diamond at the correct angle, and frequent readjustment is necessary. Many precious stones other than diamonds may be held during polishing by means of wax or cement, and even diamonds may be so held for the roughing out or bruting operation, but not for polishing because of the great pressure required and friction and heat developed during the polishing of a diamond, the heat thus developed being sufficient to melt the wax or the "diamond cutters' cement" used in bruting.

My present invention includes a cement of such a nature as to be adapted to successfully withstand the heat of polishing the diamond and to adhesively hold the diamond during the polishing operation, and my invention also includes a cement for this purpose which has substantially the same coefficient of expansion as the diamond or sufficient elasticity or give, so that the high heat developed by the polishing operation will not loosen the diamond from the cement, and my invention also comprehends a holding arbor to which the diamond is held by the cement, this arbor being composed of a refractory material having substantially the same coefficient of expansion as the cement and diamond.

It is to be understood that my present invention broadly comprehends a diamond holding cement, which will hold the diamond by adhesion and which possesses substantially the same coefficient of expansion as the diamond or which will not loosen or deteriorate under the heat of polishing, and a cement of this nature may include carbon or may be composed of a fusible material, provided its temperature of fusion is sufficiently high, such as enamel. My present invention further broadly comprehends, in combination with a diamond holding cement of the kind described, an arbor composed of any suitable material having substantially the same coefficient of expansion as the cement, good examples of such materials being carbon, porcelain, glass, quartz, etc. The broad invention of the cement and arbor is broadly claimed herein and the carbonaceous cement and carbon arbor are more specifically claimed herein, while the fusible cement, such as above indicated, is

broadly and specifically claimed in another application filed on even date herewith, Serial Number 710,622.

While my present invention is directed more particularly to obtaining a satisfactory solution of the peculiarly difficult problem of holding diamonds during the polishing operation, it also presents a distinct advantage in that it may be employed to hold the diamonds during the preceding operation of cutting or bruting, thereby doing away with the present necessity of transferring the diamond from the holding means employed for bruting to the other different holding means employed for polishing, involving the necessity of re-centering the diamond. Therefore, in the practice of my invention, I may cement the rough or uncut diamond to an arbor embodying my invention by means of a cement embodying my invention, and first brute or rough out the diamond in any suitable way, for example, in a lathe, and then take this same arbor, with the bruted diamond attached, and put it into a holding device and polish the diamond, without the necessity of having to transfer the diamond to another arbor.

I shall now describe my invention with reference to the accompanying drawing illustrating one embodiment thereof, and shall thereafter point out my invention in claims.

The drawing is an elevation, partly in vertical section, of a diamond holder embodying my invention.

The diamond 1 has previously been roughed out or bruted to a substantially regular rounded form. The bruted diamond is shown as held to the cupped end of a carbon arbor 2 by means of a body of carbonaceous cement 3. This cement will not be softened by the heat of polishing the diamond and, because of the fact that the cement 3 and the arbor 2 have substantially the same coefficient of expansion as the diamond 1, the expansion of the diamond under the heat of polishing will not loosen it from the arbor.

The carbon stick or arbor 2 may be of the same composition as the well known electric arc light carbons. The carbonaceous cement 3 may be composed of powdered coke, rye flour and gum shellac, or may be of other suitable composition. This cement may be made by all of the ingredients being ground and masticated together with water or thin molasses. Another formula and suitable proportions of the ingredients thereof is 75 parts finely powdered anthracite coal, 25 parts finely powdered gum shellac, 50 parts boracic acid, 25 parts chlorid of magnesium or chlorid of calcium and a sufficient solution of carameled cane sugar to make the whole into a stiff paste. Instead of the cane sugar, though less suitable, a solution of coal tar may be employed as a carbonaceous binder. In attaching the diamond 1 to the arbor 2 with this cement, the cement is applied cold and baked at a high temperature for thirty minutes out of contact with the air, to carbonize the cement so that the diamond will be held by adhesion. To remove the diamond 1 from the arbor 2, the diamond is snipped off with a pair of cutting pliers.

The arbor 2 is tapered, as shown in the drawing, and is inserted in a correspondingly flared bore in a dop head 4 provided with a tubular shank 5. The arbor 2 may be loosened from the dop head 4 when desired by turning a thumb screw 6 screw-threaded into the outer end of the shank 5, this screw being provided with a stem 7 extending within the bore of the shank 5 and adapted to push out the arbor 2.

The other parts of the diamond-holding tool may be of any suitable construction and the holder illustrated in the drawing is of a usual construction and its operation will be readily understood without the necessity of a particular description of those parts which do not directly relate to the present invention. The diamond 1 is shown as held in position for polishing on a lap 8, a portion only of which is illustrated in the drawing.

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

I claim:—

1. Means for holding a diamond comprising a diamond-holding adhesive cement having resistance to heat above the temperature produced in diamond polishing, and an arbor having substantially the same coefficient of expansion as the cement and to which the cement is attached by adhesion to hold the diamond on the arbor.

2. Means for holding a diamond comprising an arbor, and a carbonaceous cement for holding the diamond to the arbor.

3. Means for holding a diamond comprising a carbon arbor, and a carbonaceous cement for holding the diamond to the arbor.

4. Means for holding a diamond comprising a diamond-holding adhesive cement having resistance to heat above the temperature produced in diamond polishing and also having substantially the same coefficient of expansion as the diamond, and an arbor having resistance to heat above the temperature produced in diamond polishing and also having substantially the same coefficient of expansion as the cement and to which the cement is attached by adhesion to hold the diamond on the arbor.

5. Means for holding a diamond com-

prising an arbor, and a carbonaceous cement for holding the diamond to the arbor, the cement including carbon, a resinous substance, a boron compound, a mineral salt and a carbonaceous binder.

6. Means for holding a diamond comprising an arbor, and a carbonaceous cement for holding the diamond to the arbor, the cement including carbon, a boron compound, a mineral salt and a carbonaceous binder.

7. Means for holding a diamond comprising an arbor, and a carbonaceous cement for holding the diamond to the arbor, the cement including a boron compound, a mineral salt and a carbonaceous binder.

8. Means for holding a diamond by adhesion during polishing of the same, comprising a body of material for holding the diamond by adhesion having resistance to heat above that evolved in diamond polishing, and having substantially the same coefficient of expansion as the diamond, and an arbor for holding said body.

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

CLYDE J. COLEMAN.

Witnesses:
WM. ASHLEY KELLY,
VICTOR D. BORST.