

F. KRAUSE.
WIRE DRAWING DIE.
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1,056,555.

Patented Mar. 18, 1913.

Fig. 1.

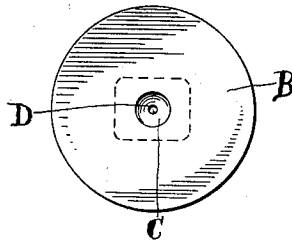
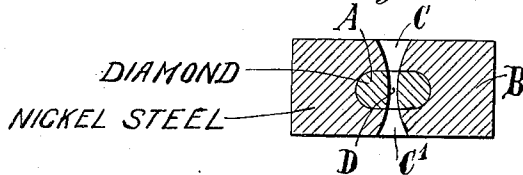


Fig. 2.



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UNITED STATES PATENT OFFICE.

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WIRE-DRAWING DIE.

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To all whom it may concern:

Be it known that I, FREDERICK KRAUSE, a citizen of the Empire of Germany, and a resident of Jersey City, county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Wire-Drawing Dies, of which the following is a specification.

This invention relates to improvements in wire drawing dies and pertains particularly to metal set wire dies.

It is the special object of my invention to produce metal set wire dies having a diamond with bore whose protective metallic mantle or ring has a very low coefficient of expansion and contraction. Heretofore such wire dies were protected against injury to the bored diamond by casting around same a protective mantle or ring of steel, which, however, possessed serious deficiencies. At the present time the metal set diamond wire drawing dies are of increased importance, as large numbers of same are used now for drawing the exceedingly fine wires for metallic filaments for incandescent electric lamps, which filaments consist of rather refractory and hard metals, as tungsten, osmium, tantalum, etc. Such exceedingly fine wires for metallic filaments for incandescent electric lamps may also be drawn while the relatively thick wire to be drawn is in a hot, or even glowing, condition. Under these circumstances the metal set wire dies failed to work satisfactorily because the protective steel mantle expands so much that the bored diamond evidently had not the protection against injury which was expected from former experiences with such dies when used for drawing wires at ordinary temperature. Practical observations and tests have proved that at higher temperatures the protective steel envelop of the bored diamond expands considerably more than the diamond itself. Accordingly with increasing temperatures during the process of drawing the wire, the effectiveness of the protective steel envelop decreases and may even cease entirely.

It is the special object of the present invention to overcome the described deficiencies and produce a protective metallic envelop or mantle which has a very low coefficient of expansion and contraction. Such envelop is preferably made of nickel or a nickel alloy, the components of which are so selected that the alloy has the property

of expanding under heat about twelve times less than steel. Metallic envelops having such a low coefficient of expansion afford fullest protection against any fracture of the diamond around its bore, even if hard wires are drawn at higher temperatures. It is evident that such dies are perfectly protected when wires are drawn thereby at ordinary temperature.

The invention is illustrated in the accompanying drawing in which:

Figure 1 represents in top plan view the protective setting with bored precious stone, and Fig. 2 is a vertical cross section of same.

Similar letters of reference denote like parts in both figures.

In the drawing A represents the precious stone or diamond, B is the protective setting or metallic envelop, C is the top portion of the opening in the setting, C¹ the bottom portion of same and D represents the bore in the precious stone or diamond.

The alloy used for the novel mantle, envelop, or ring is a nickel-steel alloy. A nickel-steel alloy answering the purposes of this invention consists of about $\frac{1}{3}$ of nickel and of about $\frac{2}{3}$ of steel. Such nickel steel alloy, containing a high percentage of nickel presents the additional advantage that it possesses a considerably higher resistance against acids used during the process of drawing wires than a steel envelop. The acids corrode steel and even dissolve it relatively easily, while the nickel-steel alloy is practically not attacked. The nickel-alloy envelop may be cast tightly around the stone and does not require a special protective surface covering of brass, for instance, which is needed on steel mantles when wires are drawn at ordinary temperature while submerging the die under water. The steel mantle certainly oxidizes quickly under water, while the nickel alloy mantle is not affected thereby.

I claim as my invention:—

1. A protective setting for wire drawing dies with bored precious stones consisting of a metallic mantle or ring having a very low coefficient of expansion in comparison with the bored precious stone employed.

2. A protective setting for wire drawing dies with bored precious stones consisting of a nickel-steel mantle or ring having a very low coefficient of expansion in comparison with the bored precious stone employed.

3. A protective setting for wire drawing dies with bored diamond consisting of a nickel-steel mantle or ring cast around same and having a very low coefficient of expansion in comparison with the bored diamond so that exceedingly fine wires may be drawn from thicker wires while same are highly heated.

4. A wire drawing die consisting of a protective metallic setting and a bored precious stone, said protective setting having a very low coefficient of expansion in comparison with the bored precious stone incased therein.

5. A die for drawing fine wires consisting of a protective metallic setting of nickel-steel and a bored precious stone incased therein, said protective setting having a

very low coefficient of expansion in comparison with the bored precious stone. 20

6. A die for drawing fine wires consisting of a protective nickel-steel setting and a bored diamond incased therein, said protective setting having a very low coefficient of expansion in comparison with the bored diamond so that exceedingly fine wires may be drawn from thicker wires when same are highly heated without injuring the boring of the diamond. 25

Signed at New York, N. Y., this 16th day of December 1911. 30

FREDERICK KRAUSE.

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