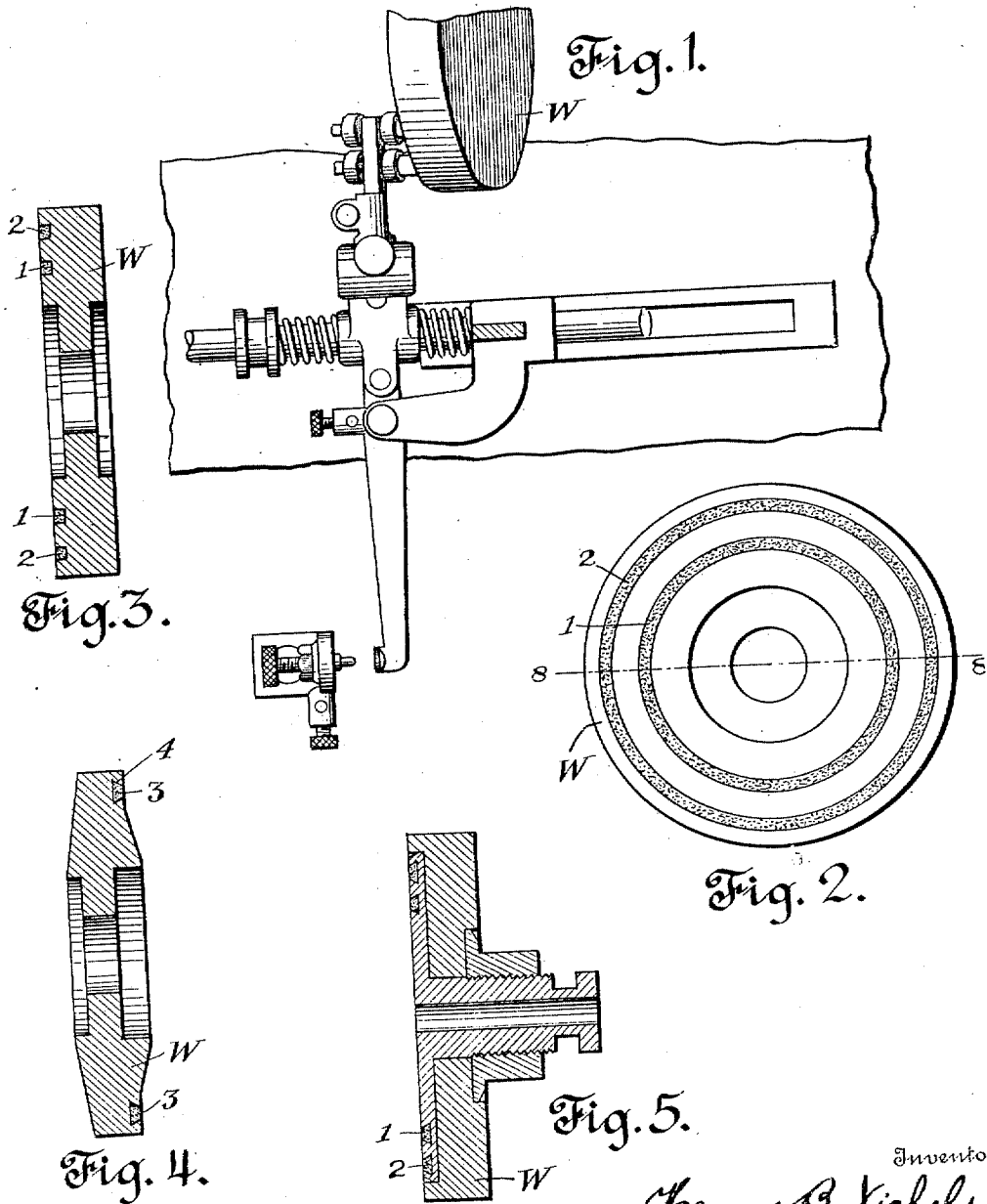


H. B. NICHOLS.
GRINDING MACHINE.
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Patented Jan. 3, 1911.

980,882.



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HENRY B. NICHOLS, OF PHILADELPHIA, PENNSYLVANIA.

GRINDING-MACHINE.

980,882.

Specification of Letters Patent.

Patented Jan. 3, 1911.

Original application filed December 27, 1909, Serial No. 535,091. Divided and this application filed May 27, 1910. Serial No. 563,755.

To all whom it may concern:

Be it known that I, HENRY B. NICHOLS, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

10 My invention relates to grinding machines and especially to certain forms of grinding wheels, for use in said machines.

This application is a division of my prior application, Serial No. 535,091, filed December 27, 1909, which in turn is a division of each of two prior applications, Serial No. 451,875, filed September 5, 1908, patented December 28, 1909, Patent No. 944,902; and Serial No. 472,236, filed January 14, 1909, patented December 28, 1909, Patent No. 944,903. In the two patented cases the claims are directed to grinding machines as such; in the prior application serial No. 535,091, I have claimed the automatic calipers as such, and in the present case I shall direct my claims to a grinding wheel with antifriction rings or inserts in its face or back. I shall not claim herein the specific form of the invention in which the inserts are set in the clamping plate instead of in the body of the wheel, because that is claimed in my divisional application, Serial No. 578,367, filed August 22, 1910.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of a portion of one of the machines shown in my prior patents and application aforesaid, showing the calipers and part of a wheel. Fig. 2 is a face view of the wheel showing the ring inserts. Fig. 3 is a section thereof on the line 8—8 of Fig. 2. Fig. 4 is a sectional view of a modification having the inserts in its back and Fig. 5 is a sectional view of another modification having the inserts set in the rear clamping plate instead of in the body of the wheel.

I will not attempt to describe in detail herein the machines to which my present invention is applied and with which it is used. For a full disclosure of said machines I refer to my aforesaid Patents Nos. 944,902 and 944,903.

In Fig. 1, I have shown a portion of the calipering apparatus described in my Pat-

ent No. 944,902 as applied to a grinding wheel of the character therein disclosed but not claimed, and which is claimed herein. After reading said patent the adjustment of the grinding wheel as effected by the calipers, will be fully understood.

Referring to Figs. 2 and 3 the body of the wheel W is formed of abrasive material such as carborundum or the like, properly shaped and with suitable fittings to secure it to the spindle. As it would be impracticable to apply automatic calipers directly to the surface of this abrasive material, I provide inserts in the shape of annular bodies of anti-friction or lubricant material at 1 and 2. The best material for this purpose which I have found up to the present time is graphite molded into channels or grooves in the wheels. One process of molding consists in mixing the graphite with water to form a thick paste, and then pressing this into the grooves so as to expel as much of the water as possible, and evaporating the rest. This process, however, is not entirely reliable in its results because of the shrinkage of the paste in drying, unless constant and very heavy pressure is employed, such as that obtainable by hydraulic means, with the attendant danger of fracturing the wheel. I prefer, therefore, to employ a binder which under ordinary conditions of temperature and pressure is a solid, and which can remain permanently incorporated with the graphite. Such a binder I have found in sulfur, which does not seem to affect the operation of the wheel or impair the efficiency of the graphite for my purpose. This is first melted, and the powdered graphite is stirred or ground into it in the proportion of two parts by weight of graphite to one of sulfur. The wheel body is then heated to a uniform temperature of about 212° Fahrenheit, the paste is poured or pressed into the grooves, and the whole allowed to cool. The two rings 1 and 2 thus formed present a smooth anti-friction surface for the calipers, sufficiently hard for accurate dimensioning, while I have found that the insert will wear away uniformly with the surface of the abrasive material and will not deter the grinding by its lubricant qualities.

Fig. 4 shows the back of a wheel, with a ring of graphite composition 3, upon which the roller of the caliper bears. This ring

may be similar to those hereinbefore referred to, but held in an undercut or dovetailed recess or groove. The composition I have employed for this ring when set into the wheel body, is formed of powdered or flake graphite held in a binder of sulfur. The sulfur is first melted, and the graphite is stirred or ground into it in the proportion of two parts by weight of graphite to one of sulfur. The wheel body having been prepared with the dovetailed recess as shown at 4 in Fig. 4, is heated to a uniform temperature of about 212° Fahrenheit, the graphite paste is poured or pressed into the groove, and the body allowed to cool. In Fig. 5 I have shown a modification in which the ring is set into the metal clamping plate on the back of the wheel. This arrangement has some advantages as for example it enables pure graphite to be employed, inserted in the groove under pressure. The ring can be made in several other ways, as by forming a paste of water, a gum solution, or the like. In any case and whether set in the wheel body or the clamping plate, I find that the undercut groove is of value in holding the ring in place, and as it constitutes an improvement over the former arrangement I shall claim it herein.

Having thus described my invention what

I claim and desire to secure by Letters Patent is—

1. A grinding wheel of abrasive material with a surface insert of nonmetallic anti-friction material. 35

2. A grinding wheel composed of abrasive material with a graphite ring set into its surface.

3. A grinding head having a body of abrasive material with an annular channel or groove, and a mass composed of graphite and a binder filling said groove. 40

4. A grinding head having a body of abrasive material with an annular channel or groove, and a composition of graphite and sulfur filling said groove. 45

5. A reducing tool for metal working machines having a working face and a deposit of nonmetallic antifriction material in its face. 50

6. A grinding wheel having an undercut or dovetail channel or groove formed in its body, and a mass of nonmetallic and non-abrasive material held in said groove.

In testimony whereof I affix my signature in presence of two witnesses. 55

HENRY B. NICHOLS.

Witnesses:

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