

No. 687,962.

Patented Dec. 3, 1901.

D. B. HYDE.  
ABRASIVE WHEEL.

(Application filed Apr. 24, 1901.)

(No Model.)

Fig. 1.

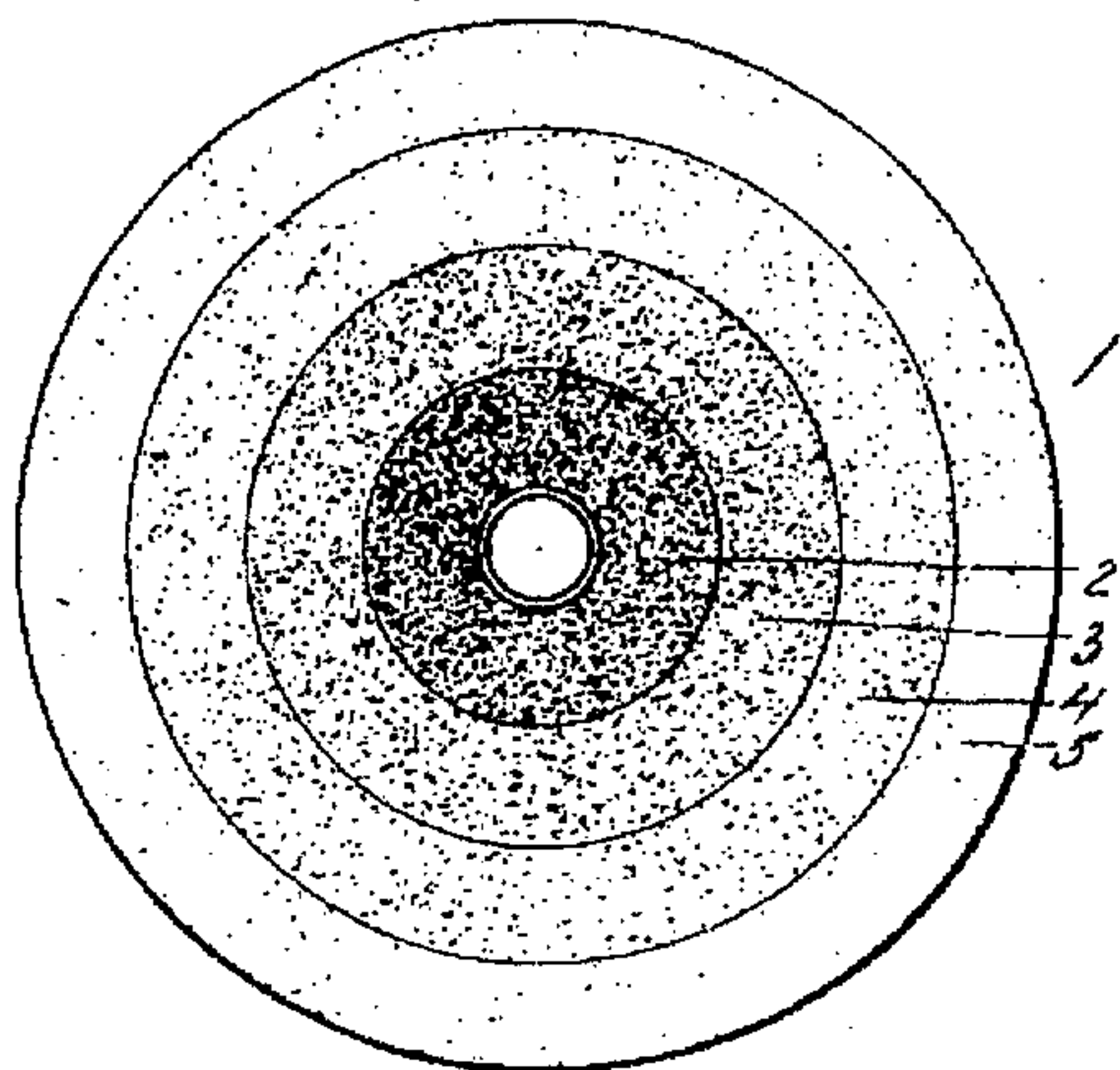


Fig. 2.

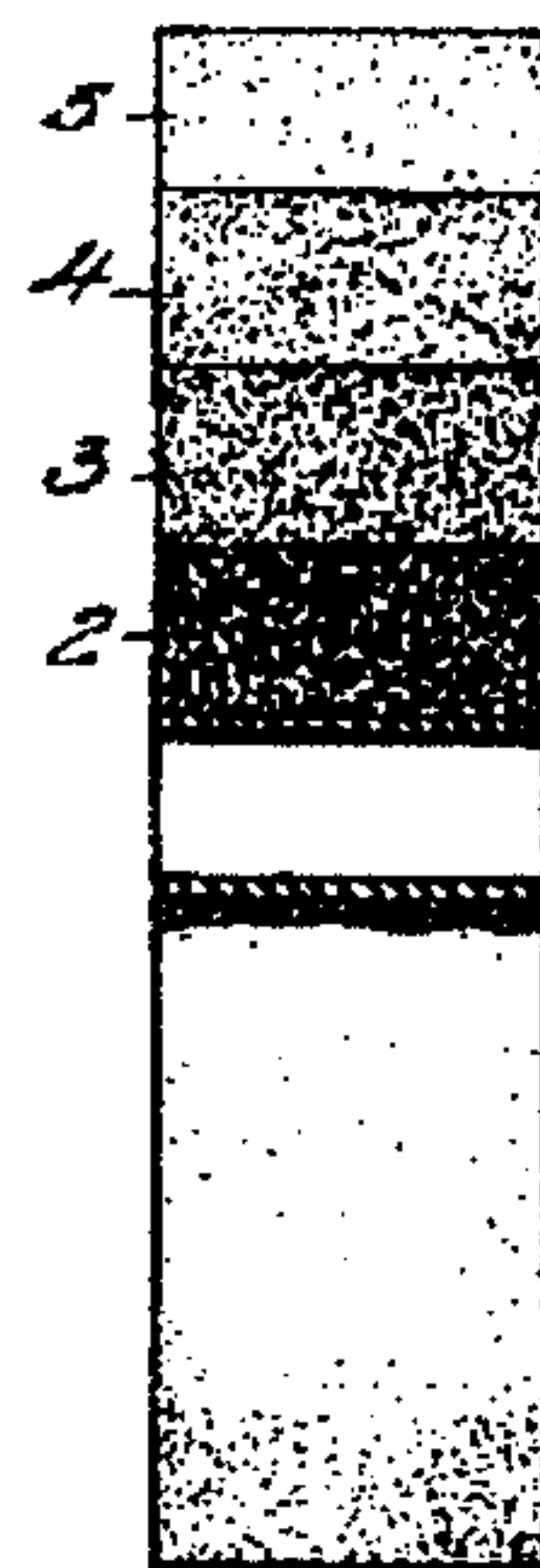


Fig. 3.

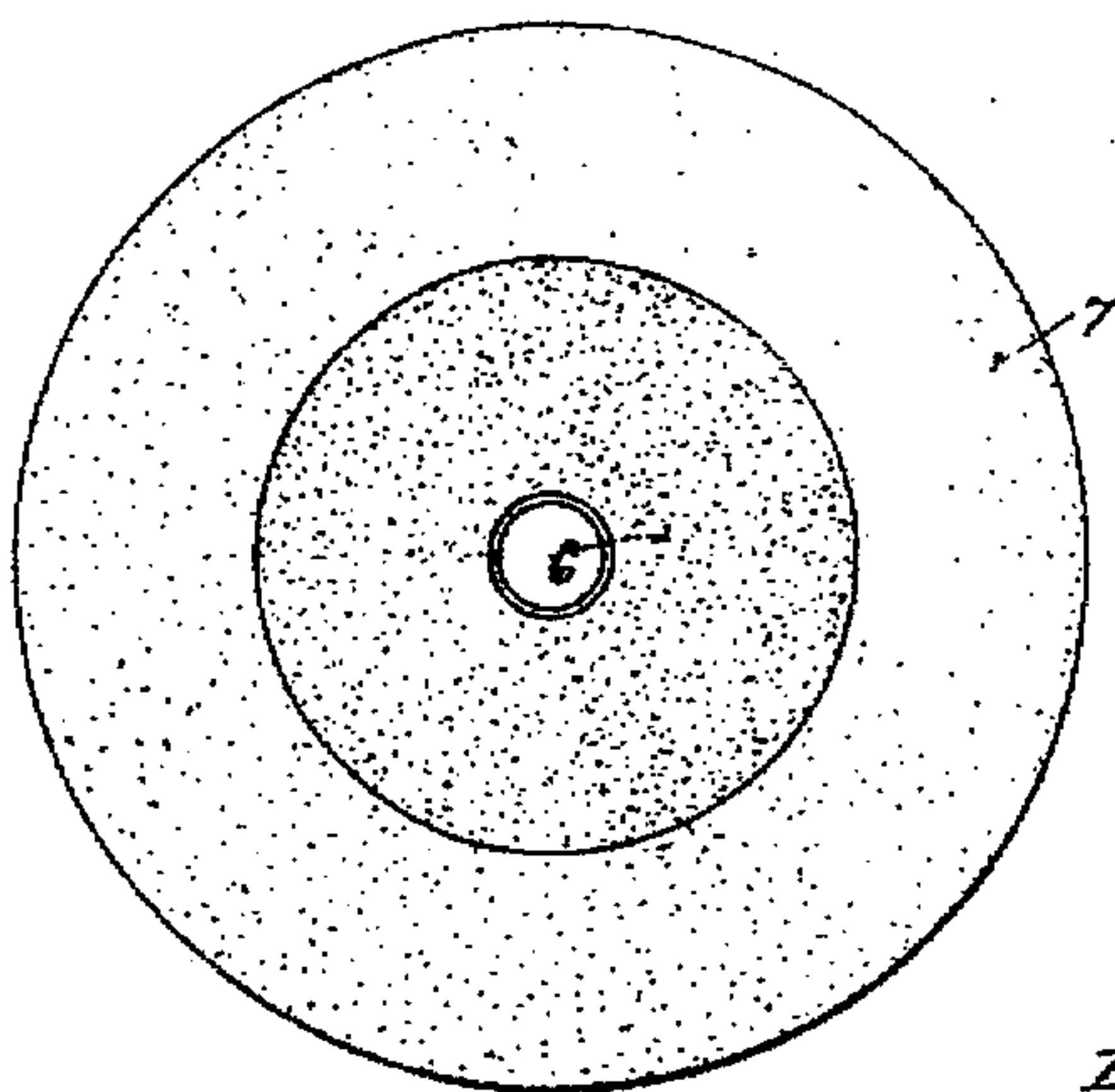


Fig. 4.

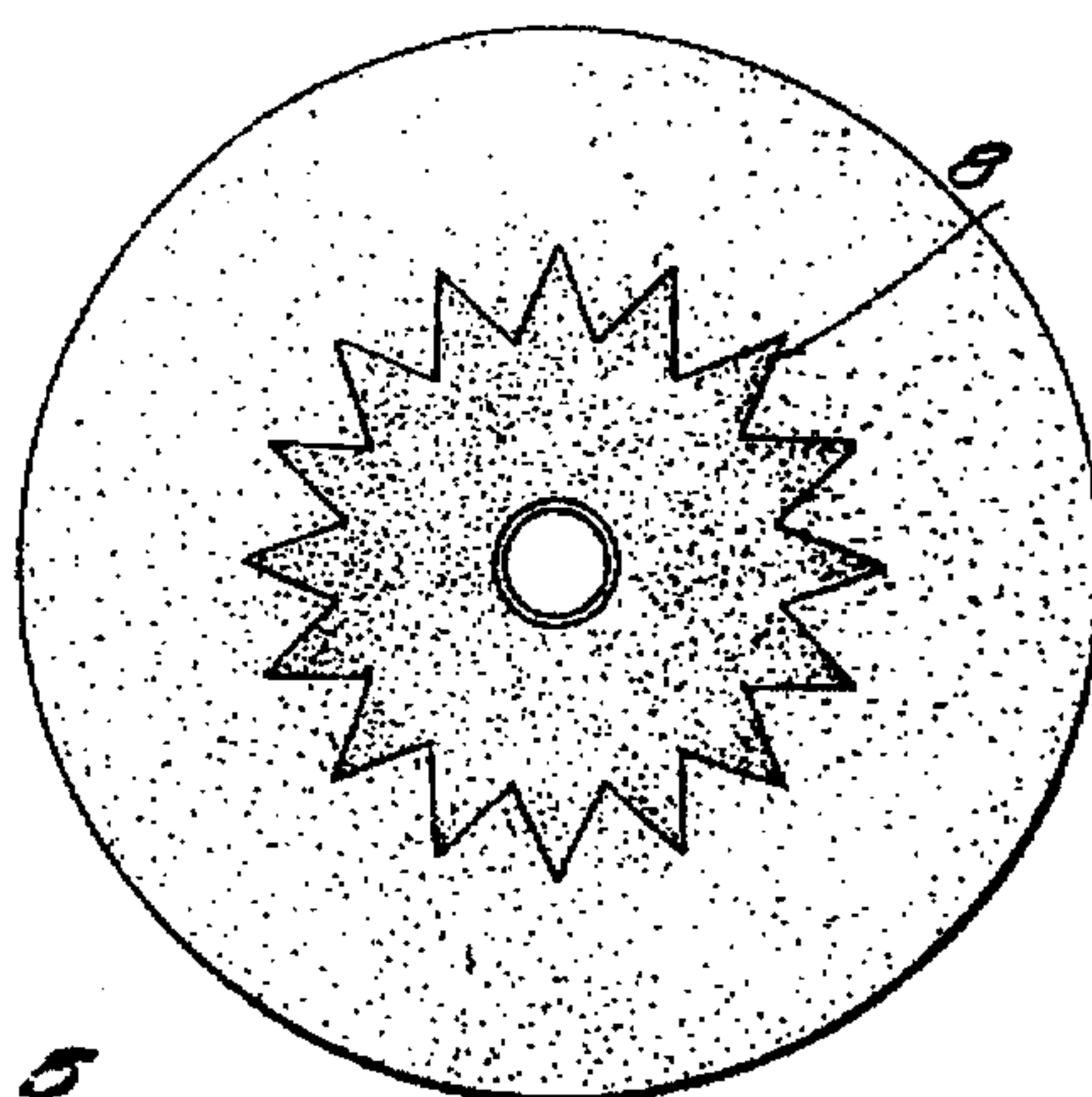
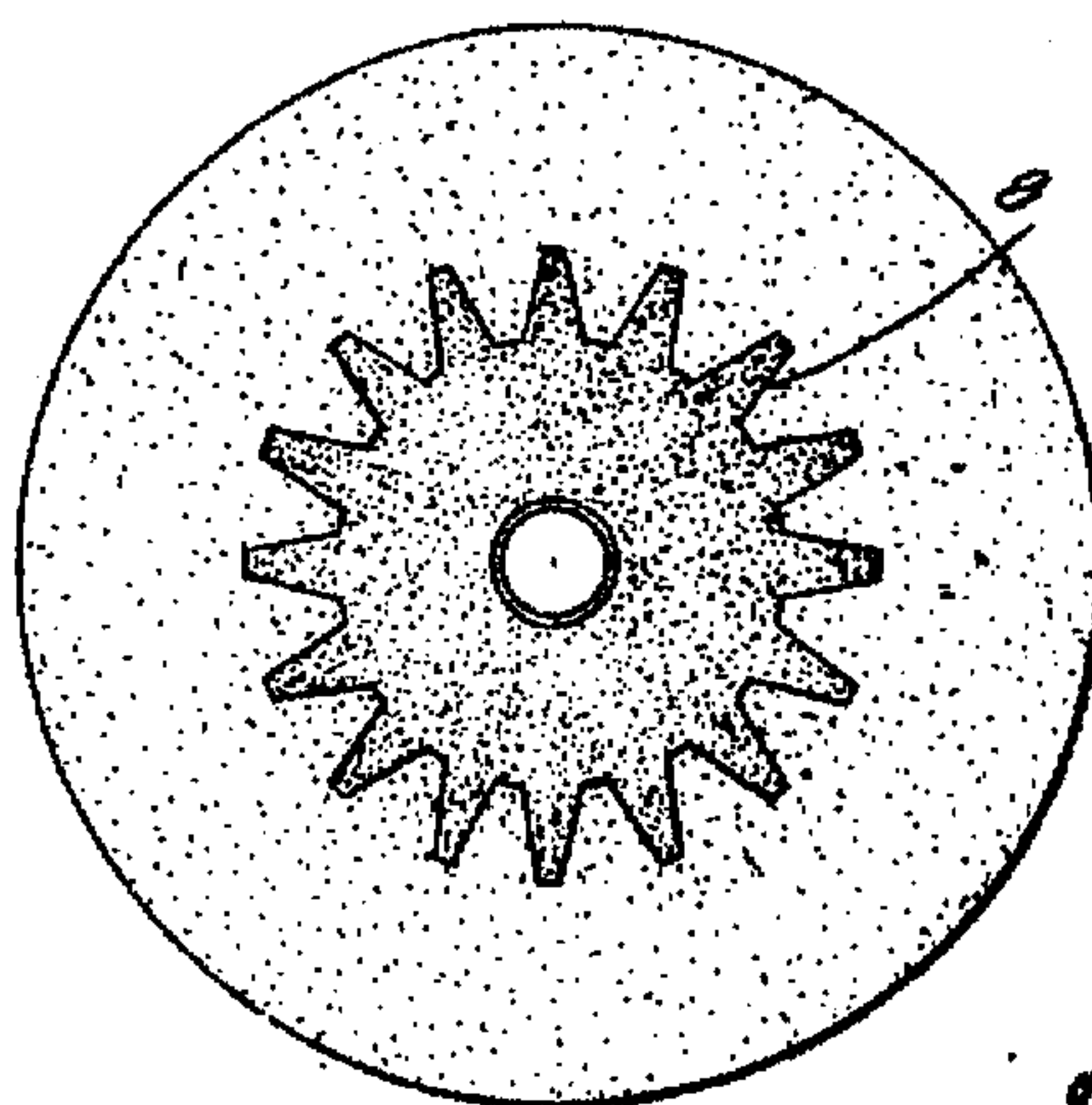


Fig. 5.



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# UNITED STATES PATENT OFFICE.

DAVID B. HYDE, OF SPRINGFIELD, OHIO.

## ABRASIVE WHEEL.

SPECIFICATION forming part of Letters Patent No. 687,962, dated December 3, 1901.

Application filed April 24, 1901. Serial No. 87,181. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID B. HYDE, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Abrasive Wheels, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to abrasive wheels, and more particularly to that class of abrasive wheels in which the periphery or edge of the wheel is utilized as an abrasive surface, the wheel itself being constructed of abrasive material, and has for its object to produce a wheel which shall have a wider capability of adaptation to different uses and a longer period of usefulness; and to these ends the invention consists in certain novel features, which I will now proceed to describe and will then particularly point out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of an abrasive wheel embodying my invention in one form. Fig. 2 is a vertical sectional view of the same. Fig. 3 is a side elevation of a modified form. Fig. 4 is a similar view of a second modification, and Fig. 5 a similar view of a third modification.

Abrasive wheels, disregarding the various methods of manufacture, vary as to the kind of abrasive material employed, the condition of the abrasive material as to coarseness or fineness, and the character of the bonding material employed. Thus the abrasive material may be emery, corundum, carborundum, diamonds, or some other abrasive material, the several materials differing in character and quality. Moreover, each of these different materials may be employed in different sizes, the grains ranging from a considerable size down to the finest flour. Again, the character of the binding medium as to hardness, due either to the material employed or to the treatment to which it is subjected, may vary within a wide range. These several elements determine what is hereinafter referred to as the "character of the composition" of which the sections or parts of the wheel are composed; and my invention consists in constructing an abrasive wheel whereof that portion or those portions nearest the center are of a composition

of a character different from the outer or remaining portion or portions which lie farthest from the center.

An abrasive wheel constructed in accordance with my invention may be composed of a plurality of sections or parts, any practicable number greater than one being employed, these sections or parts differing successively in character from the center to the periphery of the wheel, the several successive sections being preferably annular in form and their meeting and adjoining surfaces being preferably irregular, notched or toothed, and inter-fitting, so as to present as large a contact-surface as possible.

When abrasive wheels of a certain degree of hardness and diameter have been in use for a given length of time at a given speed of revolution, it has been found in practice that during the wearing off of the first inch or so of the wheel it cuts properly and wears in a satisfactory manner. The remaining portion, however, wears much more rapidly than it should if the same speed of the grinding-spindle be maintained. This is caused by the working periphery of the wheel having a much lower surface speed when the diameter of the wheel is thus decreased by wear, and where the wheel is of uniform character from center to periphery the wear is much more rapid, for the reason that experience shows that with a given hardness of wheel the wear increases with the slowness of travel in proportion to the work done, and the slower the peripheral velocity the harder should the wheel be in order to accomplish the same work with the same wear and in the same time.

It would frequently be advantageous to the user of abrasive wheels if a wheel could be obtained of considerable diameter to be used first on work requiring a coarse-grained abrasive material until the wheel is partially worn down, the wheel being then transferred to another machine requiring a wheel of finer-grained abrasive material or used in the same machine on such work. It would also be advantageous to the user to employ a wheel which could be first used on work requiring a soft wheel and which when the wheel is partially worn down could be subsequently used on a different character of work requiring, for



instance, a hard wheel. Again, the various abrasive materials vary greatly in cost, some being much more expensive than others, and it would frequently be advantageous to the user to be able to obtain a wheel constructed partially of an expensive abrasive, such as corundum, and partially of a cheaper abrasive, such as emery, the peripheral or outer portion of the wheel being constructed, say, of corundum and the inner or central portion of emery, since the entire wheel would be less expensive than one constructed of corundum alone, and after the outer corundum portion is worn away the inner or emery portion could be used on work of the character to which it is adapted. These several advantages I obtain by the construction which I have devised and which I have illustrated in several different forms, which I will now proceed to describe.

Referring first to the construction shown in Figs. 1 and 2 of the drawings, I have there shown an abrasive wheel 1 built up of annular sections 2, 3, 4, and 5, differing in the character of the composition employed either as to the abrasive material employed, the size of the grains of the material, the bonding material, as to character or hardness, or as to any two or more of these determining elements. These several sections or parts are shown as annular in form and permanently united in the process of manufacture of the wheel, so as to form a single unitary wheel. It will be readily understood that as the successive portions or sections of the wheel wear away the wheel may be employed on other work or other machines in connection with which it is adapted for use.

In Fig. 3 I have shown a wheel composed of a central portion 6 and an outer or peripheral portion 7, only two sections being employed and the two sections differing in the character of the compositions from which they are made in the manner hereinbefore set forth, for it will be obvious that my invention is not limited to the employment of any definite number of sections, any number greater than one within the limits of practicability being within its scope.

In the constructions just referred to the defining-lines between the sections of the wheel are circular; but I do not wish to be understood as limiting myself to such a construction, and in Figs. 4 and 5 I have shown constructions in which the meeting surfaces 8 of the sections of the wheel are toothed or notched, so as to interlock with each other, and thus not only present the greatest amount possible of contact-surface to obtain a better adhesion between the sections, but also provide an interlocking construction which will more firmly unite the sections and reduce the

possibility of disintegration by bursting or otherwise.

Wheels embodying my invention may be made by any of the known processes employed in the construction of abrasive wheels, and as these processes are familiar to those skilled in the art they require no particular description here. It will be understood, however, that whatever the process of manufacture employed may be—that is to say, whether the wheel is a tamped wheel, a pressed wheel, a vitrified wheel, or a vulcanized wheel—the process employed is such that when the wheel is completed it is a single or unitary mass, differing, however, as to the character of the various annular portions of which it is composed.

I do not wish to be understood as limiting myself to the precise details of construction hereinbefore described, as these details may obviously be varied without departing from the principle of my invention.

I am aware that it has heretofore been proposed to construct a polishing-head of metal or the like for polishing stone by the use of a separate abrasive material not forming a portion of the head, such head being constructed of bands of metal of gradually increasing hardness from the center to the outer edge and the head being mounted on a backing or support of a width equal to the diameter of the head and being so used that the flat face or side of the head constitutes the working surface. Such a construction is set forth in Letters Patent No. 451,327, granted April 28, 1891, to John Klar. My proposed construction is distinguished from this by the fact that the wheel itself is composed of abrasive material and that the periphery is the working surface, the clamping-plates being of less diameter than the wheel.

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

1. An abrasive wheel consisting of a plurality of annular sections differing in the character of the abrasive compositions of which they are composed, the peripheral or edge portion of the wheel constituting the working surface, substantially as described.

2. An abrasive wheel consisting of a plurality of annular sections differing in the character of the abrasive compositions of which they are composed, the meeting surfaces of the sections being toothed or serrated to interlock and present large contact-surfaces.

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

DAVID B. HYDE.

Witnesses:

AL. H. KUNKLE,  
IRVING MILLER.