

G. & A. RAYMOND.
Burr for Grinding-Mills.

No. 223,166.

Patented Dec. 30, 1879.

Fig. 1.

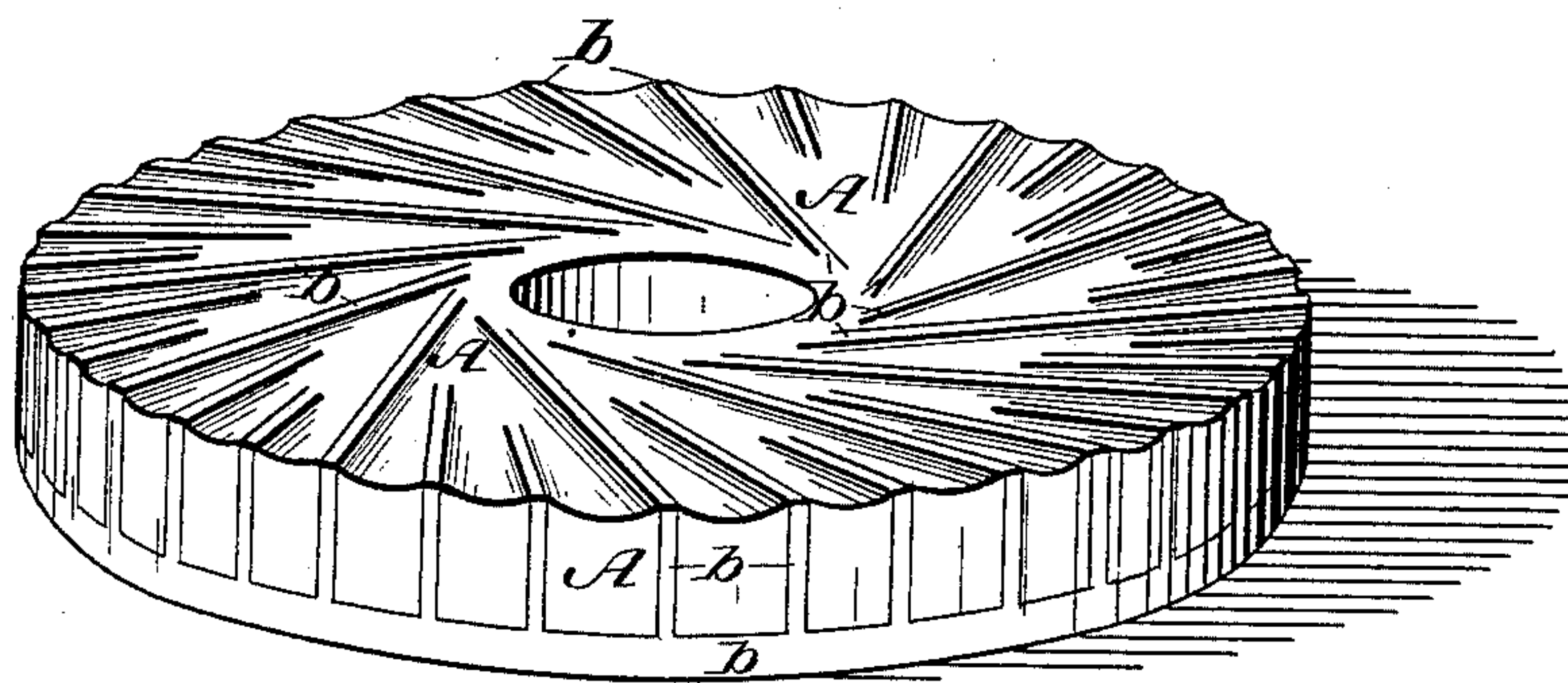


Fig. 2.

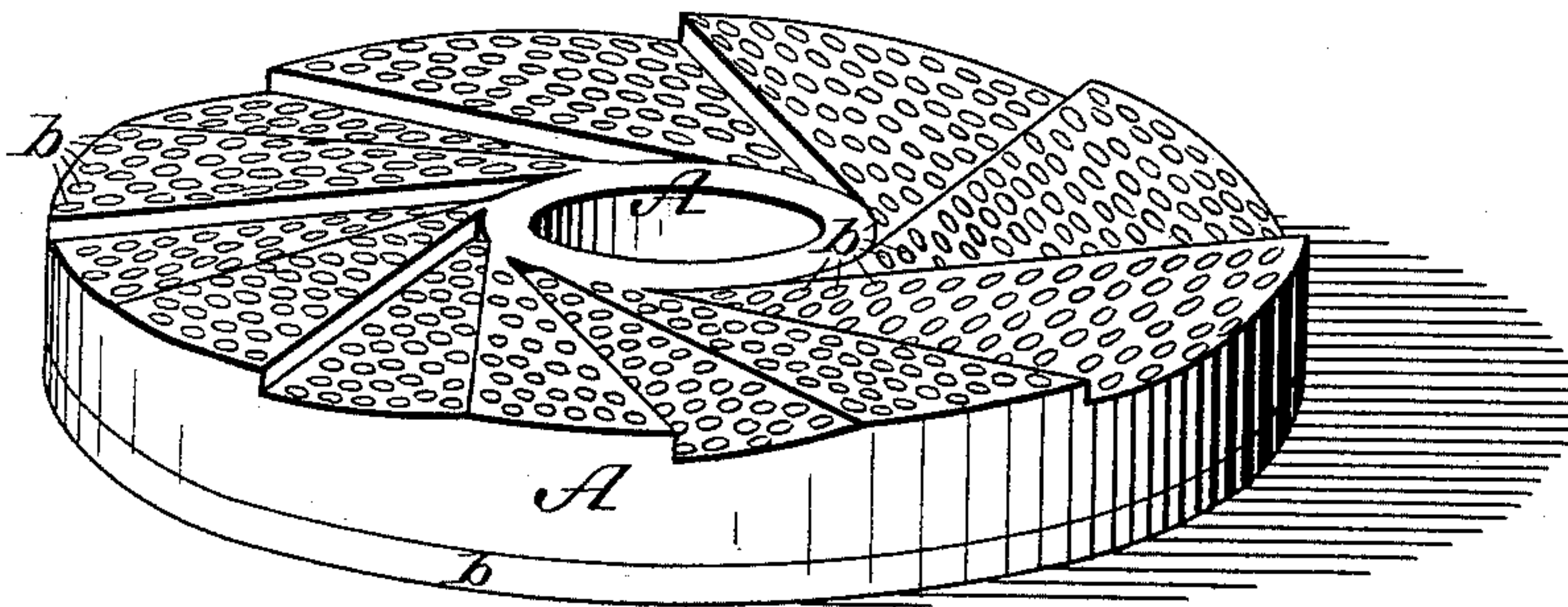
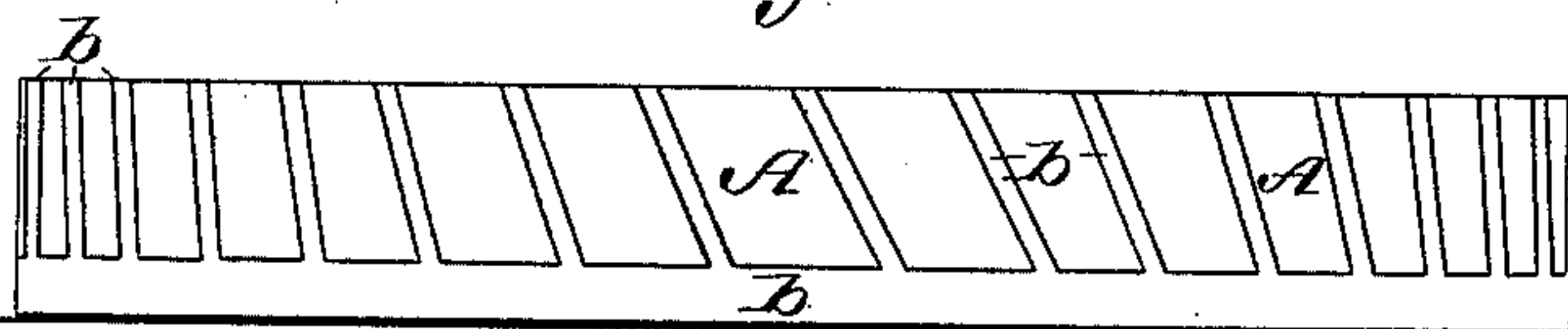


Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE RAYMOND AND ALBERT RAYMOND, OF WAUPUN, WISCONSIN.

IMPROVEMENT IN BURRS FOR GRINDING-MILLS.

Specification forming part of Letters Patent No. **223,166**, dated December 30, 1879; application filed July 28, 1879.

To all whom it may concern:

Be it known that we, GEORGE RAYMOND and ALBERT RAYMOND, of Waupun, in the county of Fond du Lac and State of Wisconsin, have invented certain Improvements in Grinding-Mills, of which the following is a specification.

Our invention relates to the formation or construction of grinding-surfaces for various purposes; and it consists in forming the same with alternate spaces of hard and soft metal, in the manner hereinafter explained.

In the accompanying drawings, Figure 1 represents a perspective view of one form of grinding-plate made according to our plan; Fig. 2, a similar view, showing a slightly different construction; Fig. 3, an edge view of a modified form.

Metallic grinders of various forms have hitherto been made, and many attempts have been made to produce a grinding-surface of metal which should retain sharp cutting-edges and wear for a long time without the necessity of resharpening. The more common method of construction is to cast the grinders, of whatever form desired, with the dress upon their face, said face being chilled in casting, to render it hard and prevent its wearing rapidly away. In practice it is found, however, that such grinding-surfaces soon lose much of their efficiency by reason of the cutting-edges becoming rounded, and for the further reason that the chilling or hardening of the metal extends but a short distance below the surface, and consequently permits the softer body of the grinder to become exposed after a very slight wear of the face. Grinders have also been made by inserting steel strips or blades into grooves in a body or backing and securing them therein.

To obviate these difficulties and produce a grinding-surface which shall retain its good qualities until the body is worn out, and which shall be self-sharpening, or which, in other words, shall always retain sharp cutting-edges, is the object of our invention; and these results we accomplish by forming the body of the grinder of soft iron and the cutting portions of chilled or hardened iron or steel. The manner of arranging the hardened portions,

as also the form of the grinder and the style of dress, may be varied as desired.

In the drawings we have represented the grinders in the form of flat circular plates or disks, adapted for grinding wheat and like substances. A represents the body of the grinder, and *b* represents the hardened metal, which may be arranged in the form of radial or tangential ribs, as shown in Fig. 1, in which latter case they will also serve to produce the necessary feeding action, or in the form of studs or pins, with their upper ends flush with or projecting slightly above the face of plate or disk. When thus constructed, it will be seen that when the plates or grinders are used the soft metal will wear away more rapidly than the harder metal, leaving the latter slightly exposed and presenting cutting-edges, as in Fig. 1. This uneven wear continuing until the body is worn down too far for further use, it will be observed that the grinder will always retain sharp cutting-edges.

If desired, the ribs, when the metal is employed in that form, may be slightly inclined forward to present a sharper edge, as shown in Fig. 3.

In constructing the grinding-plates a soft-iron body is first formed by casting, spaces being left or formed therein for the reception of the hard metal. When this body is completed and has become cold it is again placed in the mold, face down, and molten iron or steel is poured in upon the same, filling the openings, and also forming a backing for the soft-metal body A, as shown.

It is desirable that the spaces or openings left for the reception of the hard metal should be quite narrow in one direction, in order that as the molten metal is poured in it may become chilled, not only on the faces which come in contact with the walls of the openings, but entirely through from face to face. This chilling of the metal renders it extremely hard, and adapts it perfectly to the purpose for which it is designed.

The above-described principle of construction is applicable to all forms of grinding-bodies and with all forms of dress.

We are aware that it has been proposed to form a grinding plate or surface by placing

strips or pieces of hardened or tempered steel in a mold and casting a soft-iron body upon them; but such plan is impracticable, for the reason that the large mass of molten metal would withdraw the temper of the strips or pieces, if indeed it did not fuse them, and thus the desired object would be defeated.

By our plan the body of the grinder is left soft, while the intermediate ribs or spaces are rendered extremely hard, and thus caused to retain their sharp edges.

Another advantage of our construction is found in the fact that the central portion of the plate, being of soft iron, may be readily bored and accurately fitted to the spindle, instead of being formed in casting, as in the case of plates having a chilled surface.

Having thus described our invention, what we claim is—

1. The herein-described method of constructing a grinding-surface, consisting in casting a body with grooves or openings therein, and subsequently running or pouring molten metal into said grooves or cavities, whereby the body is provided with chilled grinding projections or surfaces.

2. As a new article of manufacture, a grinder consisting of a cast-metal body and chilled sections or strips of metal cast firmly therein.

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