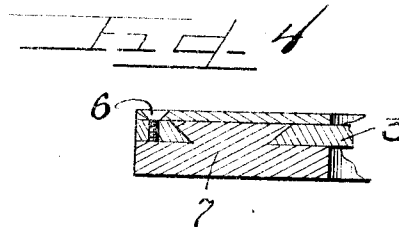
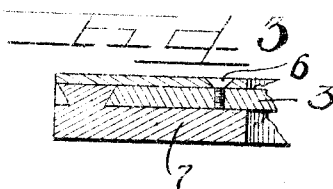
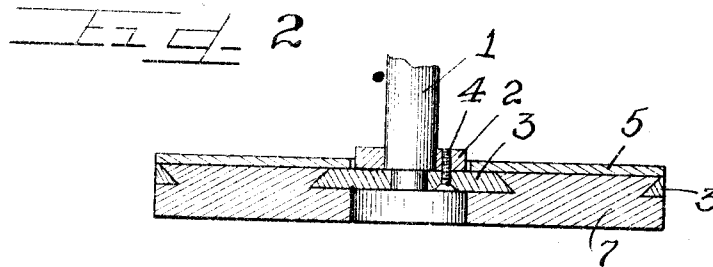
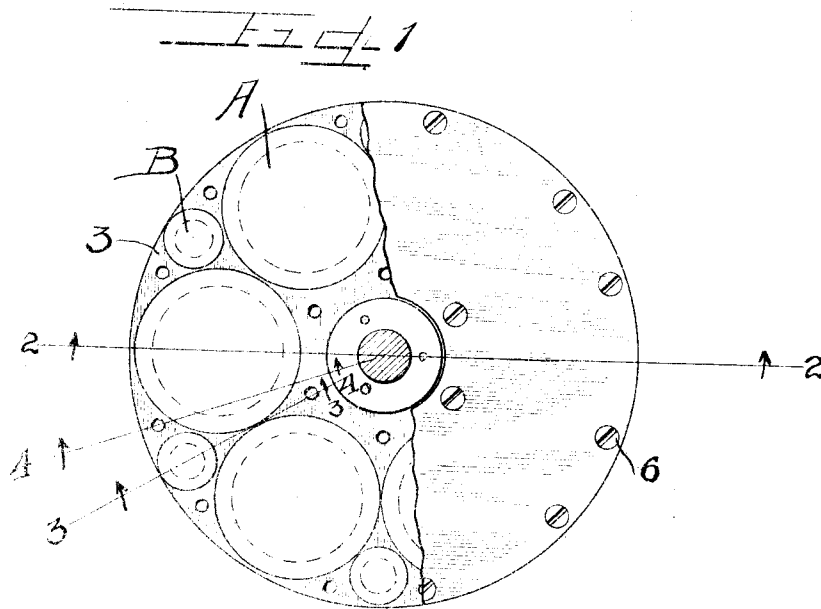


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 ABRASIVE WHEEL.
 APPLICATION FILED FEB. 19, 1912.

1,063,688.

Patented June 3, 1913.

2 SHEETS-SHEET 1.



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2 SHEETS-SHEET 2.

Fig 5

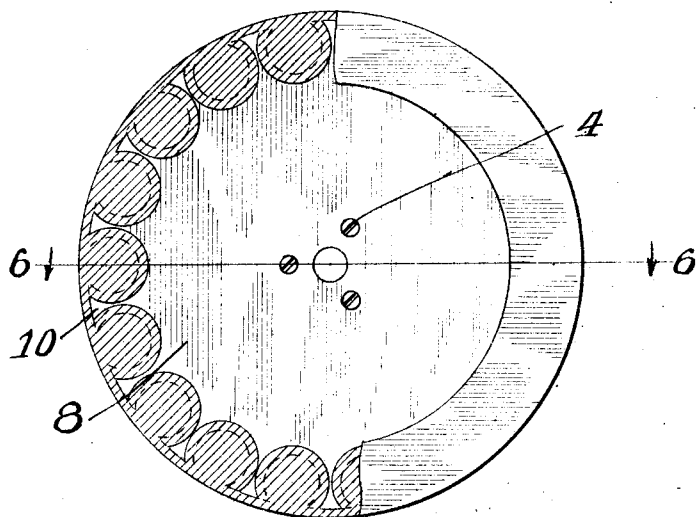


Fig 6

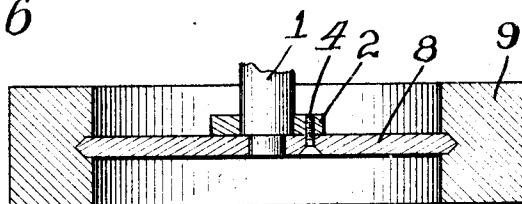


Fig 8

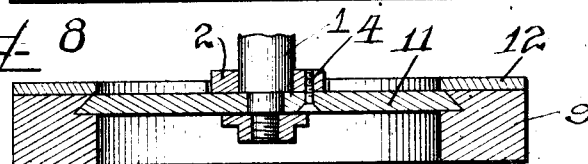
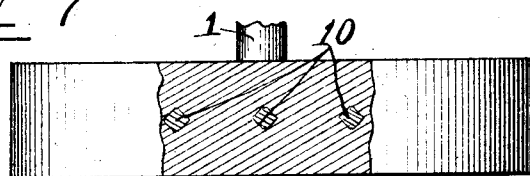


Fig 7



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UNITED STATES PATENT OFFICE.

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ABRASIVE WHEEL.

1,063,688.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed February 19, 1912. Serial No. 678,671.

To all whom it may concern:

Be it known that I, ABRAHAM L. HULL, a citizen of the United States, and a resident of the city of Valparaiso, in the county of Porter and State of Indiana, have invented certain new and useful Improvements in Abrasive Wheels; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numbers of reference marked thereon, which form a part of this specification.

This invention relates more particularly to that class of abrasive wheels sometimes called "cup emery wheels", in which there is a relatively thin inner portion of the wheels and a relatively thick peripheral portion formed up substantially at a right angle with the web or back. Owing to the increased thickness and weight of the periphery of such wheels, and the high velocity at which they are driven, considerable difficulty has heretofore been experienced in so constructing the wheels as to afford adequate strength for resisting the centrifugal force due to the velocity or rotation, and which, if the wheel is not sufficiently strong, causes the wheel to break when in use, greatly endangering the workman. Although attempts have sometimes been made in the construction of such wheels, to afford a reinforcing web or core, such web or core has been worthless after the wheel has been worn down somewhat, and has been thrown away as refuse, thus causing a considerable waste and adding unnecessarily to the expense entailed upon those who would use the same.

The object of this invention is to afford a construction for the purpose specified, affording such strength as to preclude the bursting of the wheel through centrifugal action and enabling the entire grinding surface of the wheel to be used until the wheel is used up and affording also a construction in which the core or web of the wheel may be again used for any number of times in the building up of other wheels by the renewal of the abrasive material thereon.

It is also an object of the invention to afford a construction whereby either a single or a double cup abrasive wheel may be afforded, as preferred, and in which the ut-

most economy in construction and renewal, and entire safety to the operator from the bursting of the wheel, is attained.

The invention, in its preferred form, is illustrated in the drawings, and is herein-after more fully described.

In the drawings: Figure 1 is a rear elevation of a face wheel embodying my invention, with the backing plate broken away. Fig. 2 is a section thereof on line 2-2 of Fig. 1, showing the shaft in elevation. Fig. 3 is a fragmentary section taken on line 3-3 of Fig. 1. Fig. 4 is a fragmentary section taken on line 4-4 of Fig. 1. Fig. 5 is a view in front elevation of the double cup wheel embodying my invention, with the abrasive rim partly broken away and in section to illustrate the construction. Fig. 6 is a section on line 6-6 of Fig. 5. Fig. 7 is a section on line 7-7 of Fig. 5. Fig. 8 is a section similar to Fig. 2, but showing a single cup wheel, with the arbor extended and a nut threaded thereon.

As shown in the drawings: 1, indicates the shaft or arbor having a collar 2, shrunk or otherwise rigidly secured thereon, and which is reduced at its ends slightly to afford a solid shoulder in the plane of the outer face of the collar, against which abuts the metallic web 3, upon which the abrasive material is secured. Said web is provided in close proximity with, and arranged about the shaft aperture therethrough, with apertures to receive screws 4, whereby said metallic web is rigidly secured to the collar, and thereby centered upon the shaft.

The web 3, shown in Figs. 1 to 4 inclusive, (which illustrate a face wheel) is provided with large sized apertures A, therethrough, as shown, circular in form, the outer edges of which extend to near, or may be cut through the periphery of the web. As shown in dotted lines in Fig. 1, and in full lines in Figs. 2 to 4 inclusive, said apertures are countersunk on the rear side of the plate to afford outwardly and rearwardly inclined sides to said aperture. Arranged between said apertures, and near or at the periphery of said plate, are smaller apertures B, which are also countersunk in the manner before described, so that the abrasive material 7, of whatsoever kind, when molded on said plate,

is in effect dove-tailed thereinto. A backing plate 5, which may be metallic and relatively thin, is secured by means of screws 6, on said web plate 3, and affords the back for the wheel and acts to hold the material in said apertures from being pressed outwardly when the abrasive face 7, has been worn thin or close down to the web.

In the construction illustrated in Figs. 5 to 8 inclusive, the web 8, (which is for a double cup wheel) is secured upon the arbor as before described, and is provided about its periphery with closely arranged apertures, which, as shown, cut through the periphery to afford outwardly opening notches, said opening through the periphery preferably in each instance being of less length than the diameter of the aperture. Where a double cup wheel is required, as illustrated in Figs. 5, 6, and 7, these apertures are countersunk on both sides inwardly to enable the abrasive material 9, to bind thereon, the metal of said web between said apertures projecting outwardly thereinto, as shown in Figs. 5 and 7, and affording substantially peripheral pins 10, which taper from their outer extremities inwardly to the web and are substantially rectangular or diamond shaped in cross section, as illustrated in Fig. 7, to bond the abrasive material thereon. In this construction, the abrasive material is molded on the web to afford a raised grinding surface on each side of the web or near the periphery, and a sufficient amount of said abrasive material covering said pins or projections 10, to a depth dependent upon whether the edge face of the wheel is to be used for grinding or not, this thickness, of course, serving to protect the article ground on said wheel from contact with any portion of the web in grinding.

The single cup wheel illustrated in Fig. 8, may be molded upon a web 11, substantially identical in construction with the web 8, shown in Fig. 5, in all particulars excepting, of course, inasmuch as a grinding face or cup is required upon but one side of the wheel, the countersinking of the apertures in the web for bonding the material thereon is provided from the rear side of the plate only, and a backing plate or ring 12, (preferably metallic) is secured to the plate or otherwise rigidly secured thereto substantially as before described with reference to the face wheel shown in Figs. 1 to 4 inclusive, and for the same purpose.

In operation, the wheel is used, of course, as other wheels for a similar purpose are used, although, owing to the extreme rigidity of the web on which the abrasive surface is molded, and the large amount of material bonded in said web, any desired pressure in grinding may be applied to the wheel, or

the wheel may be driven at any desired rate of speed without danger of breaking. Furthermore, owing to the construction described, the wheel, whether a face wheel, a single cup, or a double cup wheel, may be used without difficulty or danger until the abrasive material is worn to the web, for the backing plate supports the bonded abrasive material in the apertures in the web, while the double countersink in the double cup wheel adequately supports the bonded material from pushing out of the apertures, at least until the material is worn to the web. When the abrasive material is worn away to render the wheel undesirable for further use, the webs and backing plates are utilized by molding other abrasive material thereon, hence the initial expense for said webs, in view of their long period of use, each to afford many wheels, may be considered as negligible. Of course, it is to be understood that the particular arrangement and shapes of the apertures in said webs, and the countersinking thereof, the material of which said webs may be composed, as well as the backing plates (if any are used) may vary through a wide range, dependent upon the use to which the wheel is to be put. I have illustrated and described but a preferred construction embodying my invention. I therefore do not purpose limiting the patent to be granted on this application otherwise than necessitated by the prior art.

I claim as my invention:

1. A device of the class described embracing a metallic plate or web having apertures, some closely arranged therethrough intersecting the periphery thereof and others spaced within the periphery and shaped to wedgingly engage material molded therein, and abrasive material molded on said plate and filling said apertures and affording a raised peripheral rim on one or both sides said plate.

2. A device of the class described embracing a circular metallic flat web or plate having a central shaft aperture therethrough, and provided with apertures arranged around and opening through the periphery thereof, said opening through the periphery having less length than the diameter of the apertures, said plate countersunk on one or both sides at each aperture to rigidly engage material bonded therein, and an abrasive rim molded on said plate or web on one or both sides thereof and extending beyond and covering the periphery of said plate or web.

3. A device of the class described embracing a flat plate or web apertured for centering upon a shaft, and apertured adjacent the center to receive screws for engaging the same upon a collar secured on such shaft, closely arranged, flat outwardly flaring pins integral with said plate at its periphery and

affording therebetween notches or recesses wider between the teeth approximately at their middle than at the outer ends of the teeth, and a rim of abrasive material molded
5 around and on the periphery of said web and bonded in said notches and on said pins.
In testimony whereof I have hereunto sub-

scribed my name in the presence of two subscribing witnesses.

ABRAHAM L. HULL.

Witnesses:

CHARLES W. HILLS, Jr.,
GEORGE R. MOORE.