

E. B. GARDNER.
GRINDING WHEEL.
APPLICATION FILED APR. 8, 1920.

1,415,331.

Patented May 9, 1922.

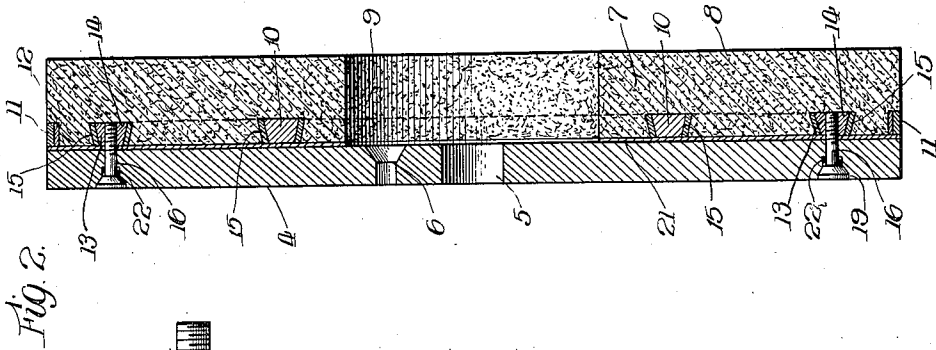


Fig. 2.

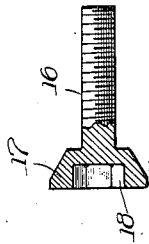


Fig. 3.

Fig. 4.

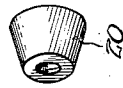
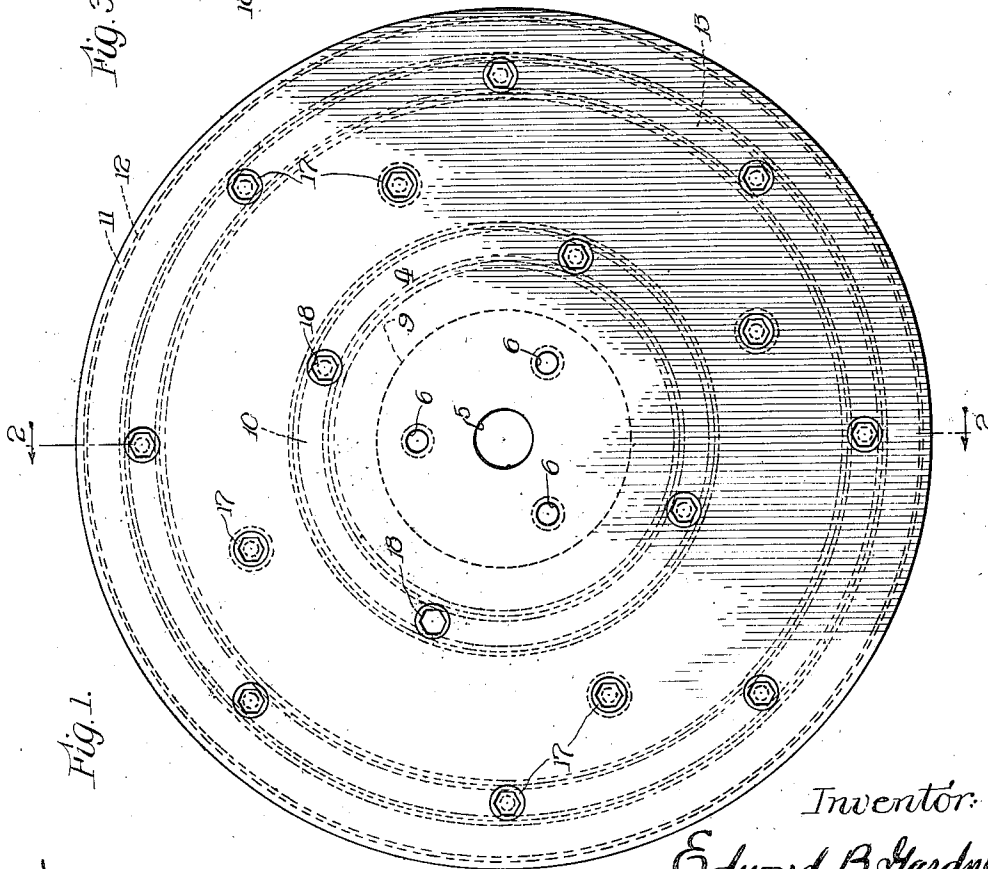


Fig. 1.

Witness:
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UNITED STATES PATENT OFFICE.

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GRINDING WHEEL.

1,415,331.

Specification of Letters Patent.

Patented May 9, 1922.

Application filed April 8, 1920. Serial No. 372,289.

To all whom it may concern:

Be it known that I, EDWARD B. GARDNER, a citizen of the United States, residing at Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in a Grinding Wheel, of which the following is a specification.

This invention relates in general to grinding wheels and has more particular reference to that type of wheel which presents a grinding face perpendicular to the axis of rotation.

Grinding wheels of this character heretofore employed comprise a flat faced disc of metal, to the face of which an abrasive sheet such as emery cloth is secured by glue, cement or the like. Since such a sheet is necessarily relatively thin, being customarily not over $\frac{1}{16}$ th of an inch in thickness, the sheet quickly wears through in service, necessitating frequent renewals. The method of renewing these sheets is to strip the worn sheet from the face of the metal disc, and then apply a new sheet, which operation requires the use of cement and of a wheel press in which the metal disc and the sheet applied thereto are subjected to pressure for the purpose of firmly and smoothly securing the sheet to the disc.

This method of renewal is slow and expensive and in addition, grinding wheels of this character are suitable only for dry grinding work, since wet grinding will destroy the abrasive sheet and loosen it from the supporting disc.

One of the primary objects of my present invention is to provide a grinding wheel which will obviate the objections to grinding wheels now employed, and with this end in view, I have provided a wheel in which the abrasive or grinding element may be of any desired thickness, and customarily, will be at least one inch thick. An abrasive element of this character can obviously be used for a long period of time before it is worn out and when renewal becomes necessary, the worn element may be removed, and a new one substituted quickly and easily by means of improved fastening devices, which my invention contemplates, for securing the abrasive element to its supporting disc and without the use of special tools or of a wheel

press or other similar machine, which has heretofore been necessary.

A further object of my invention is to provide as an article of manufacture, an abrasive element which may be sold to users and mounted by them upon the supporting disc quickly and easily with unskilled labor, each abrasive element being adapted for prolonged use without renewal and being suitable for either wet or dry grinding, as may be desired.

Other objects and many of the inherent advantages of my invention will be readily appreciated, as the same becomes better understood, by reference to the following description, when considered in connection with the accompanying drawings.

Referring to the drawings:

Fig. 1 is a rear elevation of a grinding wheel embodying my invention;

Fig. 2 is a diametral sectional view of my improved grinding wheel, taken on the line 2—2 of Fig. 1;

Fig. 3 is a detail of one of the anchor bolts by which the abrasive element is detachably secured to the metal supporting disc; and,

Fig. 4 is a detail of an anchor nut adapted for engagement with said bolt.

From an inspection of the drawings, it will be observed that my improved wheel comprises a disc 4, preferably made of steel or other material possessing sufficient strength and rigidity and adapted to be mounted upon a rotating shaft. With this purpose in view, the disc is provided with a central aperture 5, adapted to fit over the end of a shouldered shaft (not shown) and in proximity to this aperture, there are provided countersunk holes 6, adapted to receive screws or bolts, which pass through the disc and into the shaft or a collar thereon to lock the disc to the shaft.

The abrasive element designated generally by reference character 7 is composed of suitable abrasive material and obviously, may be of any desired thickness and size and is disc shaped, presenting a flat rear face, opposed to the supporting disc 4, and a flat front face 8 which presents a flat grinding surface of substantial area. This abrasive element may be solid, if desired, but for purposes of economy and lightness, it preferably has a cen-

tral aperture 9, which also permits access to the locking bolts or screws disposed in the holes 6 so that the wheel, consisting of the disc 4 and the abrasive element 7, can be
5 bodily attached to or removed from the supporting shaft when desired. For the purpose of reinforcing and strengthening the abrasive disc circumferentially and to prevent the same from chipping or breaking
10 away at the inside edge, I prefer to apply a metal band 11 at this point, the abrasive element being provided with a groove to receive the band so that the outer edge of the band will lie flush with the circumference of
15 the abrasive disc. To insure a snug fit, a cushion 12 of lead or other suitable material may be interposed between the opposed faces of the abrasive disc and the strengthening band.

20 The abrasive element 7 is constructed as an article of manufacture independently of its supporting disc 4 and is detachably secured to this disc for use by means of suitable attaching devices of any preferred construction.
25 I have illustrated on the drawings, one practical and preferred type of attaching device, consisting of anchor bolts and anchor rings or nuts mounted in the abrasive element itself. The anchor rings are designated by
30 reference characters 10 and 13, and as will be apparent from Fig. 2, they are tapered transversely and adapted to be inserted in similarly shaped undercut grooves or sockets 14
35 formed in the rear face of the abrasive element, and each ring is securely anchored in its groove by a surrounding quantity of lead 15 or other material, which may be poured into the grooves around the rings and will
40 harden therein to firmly anchor the rings to the disc.

I have shown for purposes of illustration, two anchor rings but obviously, more may be employed if desired. In conjunction with the rings and as supplementary fastening means,
45 I may utilize a series of anchor nuts 20 of tapered formation and seated in undercut sockets wherein they are anchored by lead or other anchoring means in the same manner as the rings. The rings and nuts may be used
50 as alternative constructions or they may both be used in the same disc arranged as shown in the drawings or otherwise, as preferred.

The anchor bolts are designated generally by reference character 16 and these bolts are
55 preferably provided with flared heads 17, each recessed at its outer end as indicated at 18, to receive a hexagonal or other shaped internal wrench. The supporting disc 18 is provided with countersunk openings 19 to
60 receive these anchor bolts, so that the bolts may be projected through the openings and threaded into the anchor rings or nuts as the case may be, to detachably secure the abrasive element 8 to the supporting disc.

In order to insure a snug fit of the abrasive
65 element against the face of the supporting disc, and also to avoid injury to the abrasive element, I prefer to interpose between this element and the disc 4, a pad or sheet 21 of
70 suitable material, such as blotting paper, for instance, or other relatively soft material, which will afford a suitable cushion between the element and its supporting disc. To
75 provide a further cushioning effect and to preclude the anchor bolts from becoming accidentally loosened, I prefer to interpose
80 between the head 17 of each bolt and the bottom of the socket in which the head is located, a spring washer 22, which serves to maintain a tension on the bolts at all times
85 and prevents them from working loose. While other means for detachably mounting the abrasive element on the supporting disc might be employed, it will be manifest that
90 the means disclosed are adapted to provide a firm and secure attachment while at the same time enabling the element to be readily removed from the disc when required, and further, this means of attachment leaves no
95 projecting parts which might catch the clothes of an operator and cause accidents.

The wheel as a whole, comprising the supporting disc and the abrasive element, may be assembled and shipped as a unit from the
100 factory to the user, who can readily attach it to the shaft in the manner previously described without disconnecting the abrasive element from its disc. Subsequently, the
105 abrasive elements may be purchased for replacement without purchasing a new supporting disc, and the old element when worn down can be readily removed and replaced by a new one quickly and easily, and
110 by unskilled labor. The grinding wheel presents an unbroken grinding surface of considerable area, which can be used for
115 either wet grinding or dry grinding, without injury to the wheel, and since the abrasive element is of substantial thickness, it will wear for a considerable period of
120 time without replacement.

It is believed that my invention and many of its attendant advantages will be understood and appreciated from the foregoing
125 without further description, and while I have shown and described a preferred embodiment thereof, it should be understood that the invention is capable of considerable modification in its structural details, without departing from the essence of the invention
130 as defined in the following claims.

I claim:

1. As an article of manufacture, an integral continuous circular abrasive element
135 composed of abrasive material presenting a grinding face perpendicular to its axis of rotation, the rear face of said element having a plurality of anchoring devices em-

bedded therein and fixedly secured thereto, which devices are adapted to receive fastening members by which said element may be detachably mounted upon a rotating support.

5 2. An article of manufacture, comprising an integral substantially circular abrasive element composed of abrasive material of substantial thickness and provided with a circumferential reinforcing band and 10 equipped on its rear face with attaching devices for attachment of the element to a rotating supporting disk.

EDWARD B. GARDNER.