May 24, 1938. J. E. LOEWY 2,118,409

ABRASIVE ASSEMBLY

Filed March 20, 1937

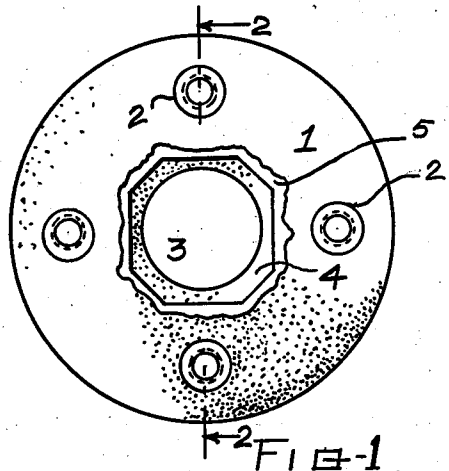


FIG-1

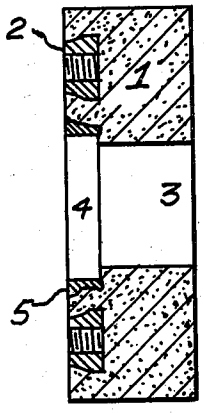


FIG-2

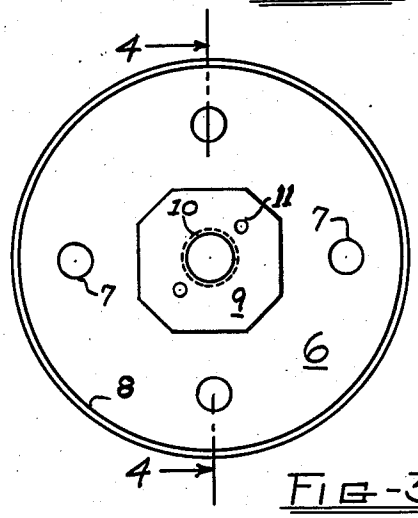


FIG-3

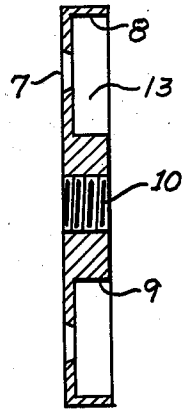


FIG-4

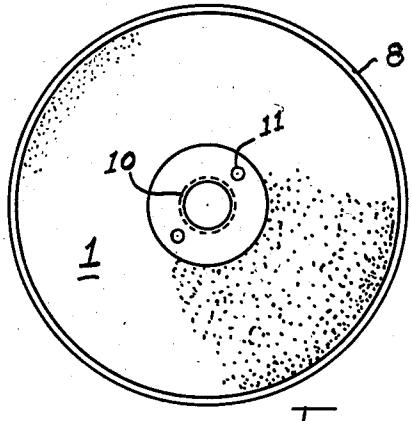


FIG-5

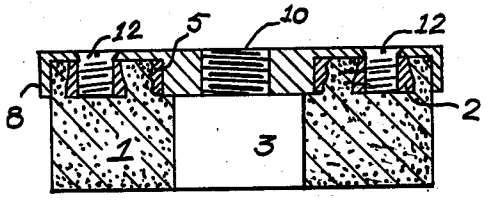


FIG-6

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ABRASIVE ASSEMBLY

Julius E. Loewy, Philadelphia, Pa.

Application March 20, 1937, Serial No. 131,986

2 Claims. (Cl. 51—209)

My invention relates to an abrasive assembly especially adapted for organically bonded abrasion wheels or those bonded with synthetic resins.

As is well known in the art, the problem of mounting abrasive wheels of the above type, especially cup wheels or similar wheels in which the face of the wheel is used for cutting, rather than the peripheral edge, is a serious one. Some form of backing plate for the wheel is considered essential, not only for driving but also for strength and safety. It has been common to form a union between the wheel and the backing plate such that they are normally inseparable but this has made it necessary to supply a backing plate with each wheel, with the result that when the wheel is worn down, either the backing plate and the remainder of the wheel is scrapped or the customer expects the plate to be salvaged and used again, a difficult matter because of wear, inherent formation, and frequently in the heavy industries, abnormal abuse. Moreover the baking of the wheel on its backing plate is attendant with some difficulties, including the handling and routing of the plates, and it must be remembered that the high speeds of abrasive wheels and their very nature and function require that the safety factor in their use be predominantly considered in their structure and assembly. For high speed wheels a consideration of balance dictates a machined backing plate of high initial cost and the provision of such a plate with each wheel not only makes an original or a replacement unit expensive but slows up production in the factory and tends in the field to cause the customer to use his abrasive wheels to the very limit point with resulting danger to the operator.

An object of my invention is to provide an abrasive assembly of satisfactory structure comprising a separable wheel unit and a backing plate to which it may be removably secured or fastened to the end that worn wheels may readily be replaced by new ones using the same plate.

A further object is to provide such an abrasive assembly in which the function of the securing or fastening arrangement is solely to clamp the abrasive wheel to its backing and hold it on its driver and the driver is separately provided for, removing the strain of driving the wheel from the securing members.

Still further objects are to provide a novel form of backing plate for the purposes described and to provide as separable units the backing plate itself and a face grinding wheel without a backing plate suitable for replacement or for original use on the backing plate and of relatively low cost.

With the foregoing and other objects in view, as will be apparent to those skilled in the art as the description proceeds, my invention resides in the combination and arrangement of parts and in the details and methods of construction described in this specification and particularly pointed out in the appended claims, it being understood that changes may be made in the particular embodiment of the invention within the scope of what is claimed, without departing from the spirit of the invention. I intend no limitation other than those of the claims when fairly interpreted in the light of the full disclosure and the present state of the art.

In the drawing:

Fig. 1 is a back face view of an abrasive wheel according to my invention;

Fig. 2 is a sectional elevation on the line 2—2 of Fig. 1;

Fig. 3 is a wheel face view of a backing plate according to my invention;

Fig. 4 is a sectional elevation on the line 4—4 of Fig. 3;

Fig. 5 is a grinding face view of an abrasive assembly according to my invention;

Fig. 6 is a sectional elevation of the grinding assembly of Fig. 5.

Similar reference characters refer to corresponding parts in the several views.

In the type of abrasive assembly to which this invention has particular, but not exclusive, application, the grinding wheel is formed by a mix of abrasive materials and a binder poured into a mold as a dry powder, the whole pressed to form, taken out of the mold, baked, and faced with a cutter. Such a wheel 1 is preferably disk shaped with a central opening 3, usually circular in section. Coaxial therewith, in this embodiment of my invention illustrated in the drawing, is a driving socket 4, preferably square with bevelled corners, recessed into the back face of wheel 1. I prefer to centralize this driving socket because at this location it takes the least strength out of the wheel.

It is difficult to hold such a recessed socket to size in various wheels with various abrasives and even if of the proper size originally, it would be affected by use and would itself tend to abrade any lug or projection contacting it. I prefer, therefore, to metallically line the socket as with lead 5, making the recess a good fit to the driving protuberance 9 which may be integral with, weld-

ed to, or otherwise fastened to the driving or backing plate 6 (Fig. 3).

At equally spaced points and embedded into the wheel 1 are a plurality of nut-like members 2, 2, internally threaded for the reception of securing members 12, 12, (Fig. 6) which pass through openings 7, 7, in the backing plate 6, and clamp the wheel 1 and the plate 6 together. The receivers 2, 2, are of limited depth, not greater than the driving socket 4, and are accessible from the back or plate face of the wheel 1. In this instance, hexagon or square nuts are turned down at the exposed end so that the receiver is larger at the inner end in order to be more securely held. A multiface nut is preferred, in place of a round nut, to lessen the possibility of its turning.

A suitable backing plate 6 is provided of cup shape, that is, with an upstanding edge portion or rim 8. To fit the driving socket 4 of the grinding wheel 1, there is provided a driving protuberance projecting from the wheel surface of the backing plate, not beyond the projection of the rim 8, but preferably flush with this rim which permits the latter to serve as a visual indicator and guard as the wheel wears down. The operator is by this means enabled to know that he is not in danger of wearing the wheel to any embedded part.

To secure the backing plate 6 to any driving shaft on which it is to be mounted, a central threaded opening 10 is provided in the plate and to facilitate threading the plate 6 on such shaft (not shown) spanner holes 11, 11, may be provided. The construction described of the cup-shaped backing plate 6 with an upstanding edge 8 and, in this case, a centrally positioned driving protuberance 9, provides an annular space or recess 13 surrounding the projection 9 and within the rim 8, to receive the wheel 1. The wheel 1 seats in this recess 13 and is held clamped to the plate 6 by the fastening members 12 when suitably driven into place through the aligned openings 7, 7, which are preferably counterbored (Fig. 6). With such structure, the screws 12 have the sole duty of fastening plate 6 and wheel 1 together, holding the driving protuberance 9 into the fitted driving socket 4, and thus permitting all the driving strain to be transmitted through this positive driving connection rather than through the fastening screws.

By making the driving protuberance 9 square, and properly spacing the openings 7, 7, in the backing plate, preferably at 90 degrees apart, and correspondingly spacing the internally threaded receivers 2, 2, the latter will be automatically aligned with openings 7, 7, in whatever position the wheel 1 is placed on the backing plate 6, as the fitting of the protuberance 9 into the socket 4 thus positions the wheel to be clamped.

What I claim is:

1. An abrasive assembly comprising an abrasive wheel, a backing plate separable therefrom provided with spaced openings, threaded members adapted to secure said wheel and plate together, internally threaded receivers for said threaded securing members embedded in said wheel and spaced for alignment with said plate openings when said wheel is positioned on said backing plate, a driving protuberance on the wheel face of said backing plate and connected thereto and a metallically lined receiving socket in the back face of said wheel fitted to said plate protuberance whereby to position said wheel on said plate for alignment of said internally threaded receivers and said plate openings and to drive said wheel when said plate is driven.

2. An abrasive assembly comprising a backing plate provided with an upstanding edge portion and a central driving protuberance projecting from said plate and substantially flush with said edge portion whereby to provide an annular recess in said plate surrounding said protuberance and within said edge portion, an abrasive wheel centrally provided with a receiving socket fitted to said driving protuberance, said wheel so constructed and of such dimensions as to seat in said annular recess, and securing members adapted and arranged to removably fasten said plate and wheel together.

JULIUS E. LOEWY.