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H. E. BAUER

2,278,301

GRINDING WHEEL

Filed Feb. 12, 1941

FIG. 1.

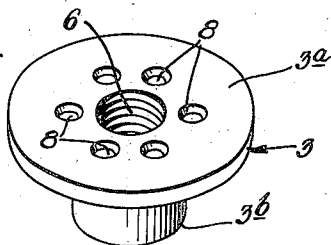


FIG. 2.

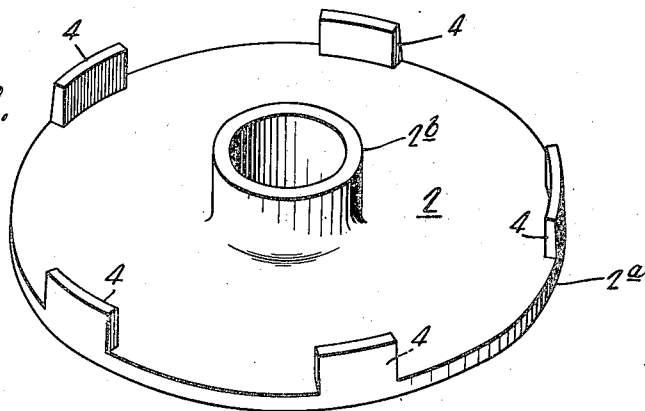


FIG. 3.

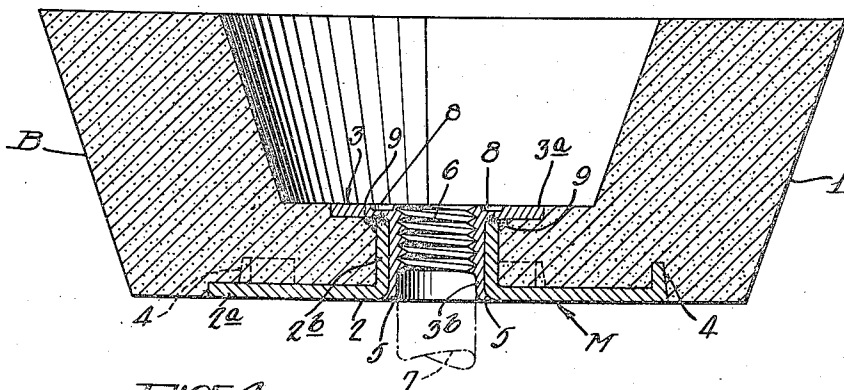
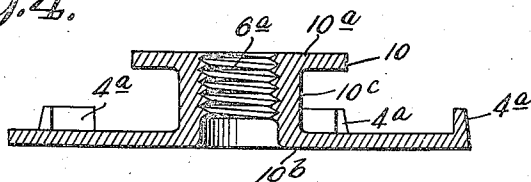


FIG. 4.



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GRINDING WHEEL

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2 Claims. (Cl. 51—209)

This invention relates to new and useful improvements in grinding wheels of the molded type and more particularly to a novel mounting insert and reinforcing means therefor.

Grinding wheels of the type mentioned are generally bonded of synthetic resins, rubber, shellac, and like materials and are employed for a number of uses. Usually molded grinding wheels bonded of these materials are provided with heavy cumbersome mounting inserts which are expensive to manufacture and do not provide adequate support and reinforcement for the molded abrasive material. Too, such mountings as have been used heretofore are quite heavy and, therefore, grinding wheels equipped with such mountings are proportionately heavier and hard to handle.

With the foregoing in mind, the invention has for its primary object the provision of a molded grinding wheel wherein there is provided a novel mounting insert which is relatively light in weight, comparatively less expensive to manufacture and which also imparts to the wheel considerably greater strength and holding power against disintegration than has been possible to obtain heretofore in wheels of this type.

Another object of the invention is to provide a molded grinding wheel having a mounting insert as set forth which is permanently associated with said wheel and constructed and arranged so as to insure a substantially perfect balanced wheel while permitting unitary or composite fabrication thereof.

These and other objects of the invention as well as the various features and details of the construction and arrangement thereof are herein-after fully set forth and described and shown in the accompanying drawing, in which:

Figure 1 is a view in perspective of one part of a mounting insert embodying the present invention for molded grinding wheels.

Figure 2 is a view similar to Figure 1 showing another part of the mounting insert.

Figure 3 is a view in section diametrically through a grinding wheel having a mounting insert made according to the present invention; and

Figure 4 is a view in section diametrically through a modified form of the mounting insert.

Referring now more particularly to Figures 1, 2 and 3 of the drawing, reference numeral 1 designates generally a grinding wheel comprising a body member B composed of suitable abrasive materials bonded together by synthetic resins, rubber, shellac or other suitable substance and a mounting insert M. The grinding wheel body

B is shaped into the cup-like form by means of a mold in the conventional manner, and the mounting insert M is embedded and bonded into the said body B during molding thereof.

The mounting insert M comprises two insert elements 2 and 3 permanently secured together and each consisting essentially of an annular disk portion 2a or 3a and a centrally located projecting tubular hub or sleeve portion 2b or 3b respectively as the case may be. These insert elements 2 and 3 preferably are stamped from sheet metal of high strength and durability and they are, therefore, relatively light in weight.

In the embodiment of the invention illustrated in the drawing, the disk portion 2a of the insert element 2 is of comparatively greater diameter than the disk portion 3a of the element 3 and its periphery is provided with a plurality of lugs 4 extending in the general direction parallel to the sleeve portion 2b. The central hub or sleeve portion 2b of the insert element 2 has an internal diameter sufficiently large to receive telescopically therein the central hub or sleeve portion 3b of the other insert element 3 in the general direction shown in Figure 3 of the drawing. It will be observed that the sleeve portion 3b of element 3 extends entirely through the sleeve portion 2b of the other element 2 and the free end edge of said sleeve 3b is coined or turned outwardly over the inner edge of the annular disk portion 2a as indicated at 5. The internal bore of the hub or sleeve portion 3b of the element 3 may be provided with threads 6 on at least a portion of its length so that the wheel may be screwed onto a threaded arbor 7 to be rotatively driven thereby, and said threads 6 are formed in a direction opposite to the direction of rotary movement of the wheel so that the latter remains on the arbor 7 during rotation. However, threads 6 may be dispensed with and the wheel mounted on its arbor or shaft by suitable clamping disk members or the like in well known manner.

Before fabricating the wheel 1, the insert elements 2 and 3 are first assembled in the telescoping relation previously described and then secured together by spot welding together the inner surface of the disk portion 3a of the element 3 and the annular end face of the hub portion 2b of the other element 2, for example, at the several points intended therefor by the recesses 8 provided in the outer surface of said disk portion 3a. However, the elements 2 and 3 may, if desired, be welded together at any other suitable location such as, for example, about the junction of the hub portion 2b and the disk por-

tion 3a as indicated at 9. After the elements 2 and 3 have been welded together as aforesaid, the free end edge of the sleeve portion may be coined or turned outwardly as at 5 over the inner edge of disk portion 2a and the internal bore of the sleeve portion 3b may be provided with threads 6 as previously described.

With the elements 2 and 3 thus permanently joined together and provided with threads 6, the now complete mounting insert M is embodied in the wheel by shaping and molding the abrasive material of the body B about said insert so that the latter is correctly positioned and embedded centrally in the base portion 1a of the wheel with the outer surfaces of the disk portions 2a and 3a of said insert M residing respectively flush with the outer and inner surfaces of said central or base portion of the abrasive material while the projections or lugs 4 at the periphery of the said disk portion 2a extend inwardly of the abrasive body B of the wheel in the direction of but spaced a substantial distance radially outward from the axis of rotation of said wheel.

From the foregoing description it will be seen that the elements 2 and 3 form an integral mounting insert structure M that becomes in turn an integral part of the grinding wheel 1 and, while the outer surfaces of the disk portions 2a and 3a of said elements are exposed to view in the surfaces of the wheel central base portion, the molded abrasive material is securely bonded to the inner surfaces of said disk portions 2a and 3a and to the outer surface of the hub or sleeve portion 2b, and is additionally keyed to the mounting insert M by means of the axially extending projections or lugs 4 which hold the wheel together against the action of centrifugal force exerted thereon during operation and use thereof.

A modification of the invention is shown in Figure 4 of the drawing and in this particular embodiment the mounting insert M is in the form of a one-piece pressure die-casting 10. It will be observed, however, that the shape, arrangement and dimensions of this casting 10 conform substantially to the insert previously described and composed of the two stamped sheet metal insert elements 2 and 3 respectively, and embody relatively spaced annular disk portions 10a and 10b, respectively, connected together by a hub or sleeve portion 10c which may be internally threaded as indicated at 6a, the disk portion 10b being provided at its periphery with lugs 4a which project in radially spaced relation with respect to the axis of the sleeve or hub portion 10c of the insert.

The present invention provides a grinding wheel of the molded or bonded type having a novel mounting insert which is relatively light in weight, comparatively inexpensive to manufacture and which imparts to the wheel a high degree of strength and holding power against disintegration from the action of centrifugal force thereon. Too, the invention provides a mounting insert that is permanently associated with the wheel and its construction and arrangement is such as to permit of unitary or composite fabrication of said wheel.

The invention, of course, is not limited in use to abrasive wheels of the cup-type illustrated in

the drawing, nor are the diameters of the disk portions 2a and 3a limited to the particular size relationship shown since said disk portions may be of the same diameter, or otherwise, as desired or required by the particular type of grinding wheel and the use to be made thereof. Too, it is entirely within the comprehension of the invention that the telescopic relation of the sleeve portions 2b and 3b may be reversed so that the former is received within the latter.

While certain embodiments of the invention have been set forth and described herein, it is not intended to limit the invention to such disclosure but that changes and variations may be made and incorporated therein within the scope of the annexed claims.

I claim:

1. A molded cup-shaped article of the character described comprising a circular body member having a continuous side wall and a base portion provided with an axial bore centrally therein, and a composite mounting embedded and bonded in the base portion of the body at and adjacent the bore therein, said mounting comprising a central sleeve portion lining the bore in the base portion of said body member and spaced annular disk portions disposed respectively with their outer surface flush in the inner and outer surfaces of the body member base portion, the disk portion disposed in the outer surface of the base portion having a diameter greater than the diameter of the inner surface of said base portion, and lugs arranged peripherally of the disk portion in the outer surface of the base and projecting into the body member in a zone outwardly of the junction of the inner surfaces of the side wall and base portions of said body member and in alignment with said side wall.

2. A molded cup-shaped article of the character described comprising a circular body member having a continuous side wall and a base portion provided with an axial bore centrally therein, and a composite mounting embedded and bonded in the base portion of the body at and adjacent the bore therein, said mounting comprising two insert elements each having an annular disk portion and a central sleeve portion, the sleeve portion of one of said elements being telescoped within the sleeve portion of the other element and lining the bore in the base portion of said body member and the sleeve portion of said other element having its end in contact with and permanently welded to the inner surface of the disk portion of said one element, the annular disk portions being axially spaced and disposed respectively with their outer surface flush in the inner and outer surfaces of the body member base portion, the disk portion disposed in the outer surface of the base portion having a diameter greater than the diameter of the inner surface of said base portion, and lugs arranged peripherally of the disk portion in the outer surface of the base and projecting into the body member in a zone outwardly of the junction of the inner surfaces of the side wall and base portions of said body member and in alignment with said side wall.

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