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METHOD OF MAKING ABRASIVE CUTOFF WHEELS

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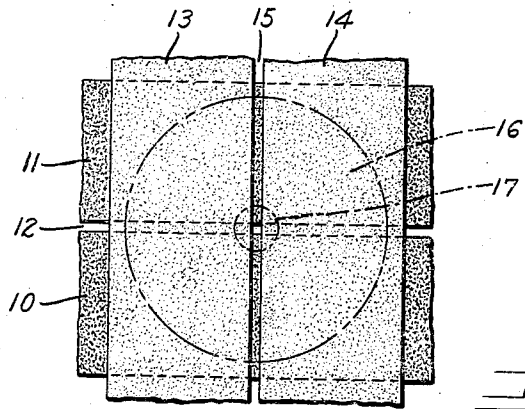


Fig. 1

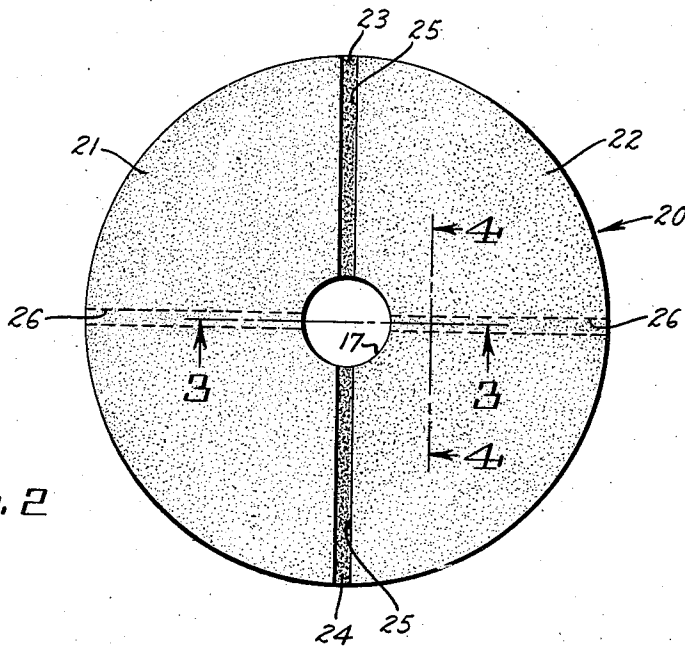


Fig. 2

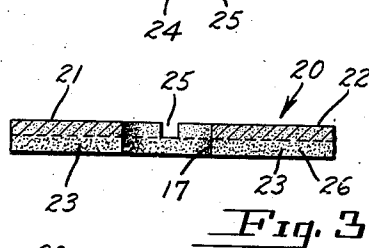


Fig. 3

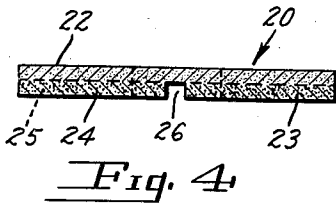


Fig. 4

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METHOD OF MAKING ABRASIVE CUTOFF
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8 Claims. (Cl. 51—293)

1

This invention relates to new and useful improvements in abrasive cut-off wheels and methods of making the same.

An object of the invention is to provide a method whereby large diameter abrasive cut-off wheels may be made without the necessity of employing large and expensive equipment.

Another object is to provide a simple and inexpensive method of making an improved construction of abrasive cut-off wheel including a feature whereby the wheel will carry large quantities of a coolant into a cut being made.

A further object is to provide an improved construction of abrasive cut-off wheel including a feature of construction whereby the wheel when in use will carry large quantities of a coolant into a cut being made.

Other objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawing wherein a satisfactory embodiment of the invention is shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawing:

Fig. 1 is a plan view illustrating the present method of making an abrasive cut-off wheel;

Fig. 2 is a front elevational view of a wheel made in accordance with the present invention, the view being on a larger scale;

Fig. 3 is a detailed sectional view taken as along the line 3—3 of Fig. 2, the view being on a further enlarged scale; and

Fig. 4 is a detailed sectional view on the scale of Fig. 3 and taken as along the line 4—4 of Fig. 2.

Abrasive cut-off wheels or discs of relatively large diameter, as for example, a diameter of 36", are in demand. However, the manufacture of such wheels as heretofore practised involves the use of relatively large and expensive equipment not available to the smaller manufacturers of abrasive cut-off wheels. The present invention provides a method whereby abrasive cut-off wheels of substantially any desired diameter may be made without the necessity of the manufacturer being provided with large, expensive equipment. In addition, the abrasive cut-off wheel resulting from the practise of the present novel method has many desirable characteristics not to be found in abrasive cut-off wheels as heretofore manufactured.

Referring in detail to the drawing and at first

2

more particularly to Fig. 1, an abrasive cut-off wheel is manufactured according to the present invention by preparing a series of strips of abrasive grain and a suitable bond. Depending on the use to which the abrasive cut-off wheel is to be put, the bond employed may be resinoid, rubber, or the like. In making a wheel of say 36" diameter, a pair of said strips 10 and 11 of approximately 19" in width are layed up in side-by-side relation with their edges spaced apart as at 12. These strips are layed in parallel or substantially parallel relation and the space 12 may be up to a quarter of an inch.

Then a second pair of strips 13 and 14 of the abrasive grain and bonding medium are layed in side-by-side relation across the strips 10 and 11. Strips 13 and 14 will also each be approximately 19" in width and are disposed with a slight space between them as at 15, this space being approximately the same as the space 12 and the strips being in parallel or substantially parallel relation. Now, a disc or wheel 16, as indicated by the dot and dash lines, is blanked from the laminated structure built up by the two layers of strips. The strips of one layer are angularly disposed with respect to the strips of the other layer and preferably the strips of one layer are at right angles to those of the other layer whereby the spaces 12 and 15 intersect or cross at right angles. The point of intersection or crossing of the medial lines of the spaces 12 and 15 will be the center or the theoretical center of the wheel 16.

As or after the wheel 16 is blanked out, an arbor opening 17 is blanked through the center of the wheel as suggested by the dot and dash lines in Fig. 1. Making the wheel as described, it will be noted that each strip (two strips in the present instance) of each layer extends through two edges of the wheel. Further, the space 12 opens through one side of the wheel, in Fig. 1 the near side, while the space 15 opens through the back or far side.

The wheel blanked from the laminated structure as described is cured in the usual or any desired manner. For example, if the bond is of rubber, it will contain sulphur and the other necessary ingredients and the blanked wheel will be cured by vulcanization. If the bond is resinoid, the blank wheel will be cured by any of the known processes for accomplishing the desired cure.

The structure of the resultant wheel is better illustrated in Figs. 2, 3 and 4, and there the same is generally designated 20 and actually comprises two upper and two lower strips in the form of segments, designated respectively 21, 22, 23 and

3

24. Each segment shaped strip is approximately a half a circle but then the strips of the respective layers are slightly spaced from one another in their adjacent edges. Thus, the spacing of the strips 21 and 22 provides a channel 25 extending diametrically across the wheel in one face thereof, the underside of said channel being closed by the strips 23 and 24.

Similarly, the spacing of the strips 23 and 24 provides a channel or groove 26 extending diametrically across the opposite face of the wheel and at right angles to the channel 25 and which channel 26 is closed on its upper side by the strips 21 and 22. Where all of the strips include the same or a similar bonding medium, or where the bonding medium of each strip is compatible with the bonding material of each of the other strips, the curing operating will result in the formation of a homogeneous or substantially homogeneous structure. If desired, the strips of one layer may be secured to those of the other layer by a suitable adhesive. This is suggested in Figs. 3 and 4 where the respective layers of the laminated structure are shown as separated by dotted lines.

In using the present cut-off wheel, the channels 25 and 26 serve a purpose in that they provide for the carrying of a cooling medium directly into a cut being made. Where these wheels operate in a flood of coolant, the channels will be filled with the coolant and as each channel moves into the cut, coolant will be carried into the cut. The coolant will be carried into the cut at alternate sides of the wheel since the channels are at alternate sides of the wheel.

The abrasive cutting wheel of the present invention and constructed according to the present method is very practical and efficient for its intended purpose. Since a substantially homogeneous structure is provided, each segment of the wheel braces the other segments. In addition to providing the channels 25 and 26, the spacing of the strips prior to the blanking of them and the maintenance of this spaced relation keeps the segments or strips of each layer from working against or causing breakage or chipping of the adjacent edge of the other segments or strips of said layer when the wheel is in use.

Having thus set forth the nature of my invention, what I claim is:

1. The method of making an abrasive cut-off wheel comprising preparing strips of abrasive grain and a bond, preparing a laminated structure by laying a first pair of said strips in side-by-side slightly spaced substantially parallel relation, laying a second pair of said strips across and substantially at right angles to the strips of the first pair and in slightly spaced substantially parallel relation to one another, blanking a disc from the laminated structure so built up with the center of said disc substantially at the point of crossing of a pair of lines bisecting the spaces between the respective pairs of strips, and then curing said blanked disc.

2. The method of making an abrasive cut-off wheel comprising preparing strips of abrasive grain and a bond, preparing a laminated structure by laying up layers of said strips with the strips of each layer longitudinally spaced from one another and the strips of each layer at an angle to those of the next adjacent layer whereby the space between the strips of one layer cross the space between the strips of the next adjacent layer, blanking a disc from the laminated structure so built up with each strip of each layer and the space between the strips of each layer ex-

4

tending to two edges of said disc, and then curing said blanked disc.

3. The method of making an abrasive cut-off wheel comprising preparing strips of abrasive grain and a bond, preparing a laminated structure by laying up layers of said strips with at least two strips of each layer longitudinally spaced from one another and with such strips of each layer at an angle to those of the next adjacent layer whereby the space between the strips of one layer cross the space between the mentioned strips of the next adjacent layer, blanking a disc from the laminated structure so built up with each mentioned strip of each layer and the space between each mentioned strip of each layer extending to two edges of said disc, and then curing said blanked disc.

4. The method of making an abrasive cut-off wheel comprising preparing strips of abrasive grain and a bond, preparing a laminated structure by laying up layers of said strips with the strips of each layer substantially at right angles to those of the next adjacent layer, blanking a disc from the laminated structure so built up with each strip of each layer extending to two edges of said disc, and then curing said blanked disc.

5. The method of making an abrasive cut-off wheel comprising preparing strips of abrasive grain and a bond, preparing a laminated structure by laying up layers of said strips with at least two strips of each layer longitudinally spaced from one another and with said two strips of one layer substantially at right angles to the said two strips of the other layer, blanking a disc from the laminated structure so built up with each strip of each layer extending to two edges of said disc, and then curing said blanked disc.

6. The method of making an abrasive cut-off wheel comprising preparing strips of abrasive grain and a bond, preparing a laminated structure by laying a first pair of said strips in side-by-side slightly spaced substantially parallel relation, laying a second pair of said strips across and substantially at right angles to the strips of the first pair and in slightly spaced substantially parallel relation to one another, blanking a disc from the laminated structure so built up with the center of said disc substantially at the point of crossing of a pair of lines bisecting the spaces between the respective pairs of strips, having the bond of each of said strips compatible with the bond of each of the other strips, and then curing said blanked disc and adhering engaging strips through their compatible bonds whereby a substantially homogeneous structure is provided.

7. The method of making an abrasive cut-off wheel comprising preparing strips of abrasive grain and a bond, preparing a laminated structure by laying up layers of said strips with the strips of each layer longitudinally spaced from one another and with the strips of each layer at an angle to those of the next adjacent layer whereby the space between the strips of one layer cross the space between the strips of the next adjacent layer, blanking a disc from the laminated structure so built up with the space between the strips of each layer extending to two edges of said disc and then curing said blanked disc.

8. The method of making an abrasive cut-off wheel comprising preparing a laminated structure by laying up on one another layers each comprising abrasive grain and a bond, laying up at least the two outer layers of said structure of

5

strips of said abrasive grain and bond, having at least two strips of each of said outer layers longitudinally spaced from one another and with such strips of each such layer at an angle to such strips of the other such layer whereby the space between such strips of one outer layer crosses the space between such strips of the other outer layer, blanking a disc from the laminated structure so built up with each mentioned strip of the outer layers and the space between each such mentioned strips extending to two edges of the disc, and then curing such blanked disc.

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