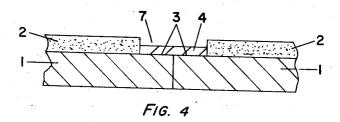
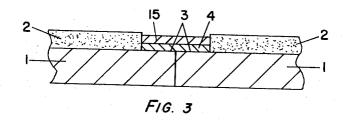
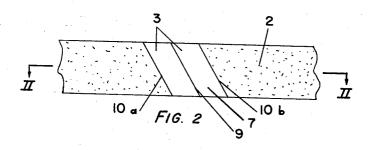
ABRASIVE BELTS AND METHOD OF MAKING SAME Filed Feb. 11, 1966







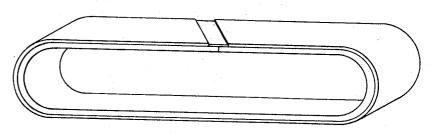


FIG. 1

INVENTOR.

JARVIS M. MC GARVEY

DV

ATTORNEY

1

3,427,765 ABRASIVE BELTS AND METHOD OF MAKING SAME

Jarvis M. McGarvey, Grand Island, N.Y., assignor to The Carborundum Company, Niagara Falls, N.Y., a 5 corporation of Delaware Filed Feb. 11, 1966, Ser. No. 526,823

U.S. Cl. 51—399 3 Claims

Int. Cl. B24d 11/00; B24b 21/00

ABSTRACT OF THE DISCLOSURE

A high strength smooth running joint for abrasive belts formed by removing the abrasive grain adjacent to the ends of an abrasive coated strip, butting the ends of the strip together to form a non-abrasive recessed area on the abrasive surface of the belt and adhesively bonding a patch of high strength flexible material in the recessed area to maintain the strip ends in abutting relationship.

This invention relates to abrasive belts and methods of making same. More particularly this invention relates to a method of joining the ends of abrasive strip material

and abrasive belts produced thereby.

Abrasive belts are normally formed by joining (splicing) the ends of abrasive sheet material together to form the endless abrasive belts. Generally the ends of conventional abrasive belts are spliced by a lap joint. This type of joint is formed by removing the abrasive layer from one end of the abrasive sheet material (skiving) or in some cases from both ends (double skiving). The ends are then coated with adhesive and overlapped. Generally the lap joint of the type described is slightly thicker than the belt which causes the belt to "bump" during operation.

A less commonly used joint for splicing together abrasive belts is the butt joint. In forming this type of joint the ends of the belt are brought together without overlapping. The ends are held together by a patch or strip of material over the ends of the belt on the print side

(non-abrasive side) of the belt.

Abrasive belts joined by lap joints or butt joints are described above have been found deficient when subjected to prolonged periods of use under conditions of severe flexing and/or stretching. Such conditions are found, for example, when abrasive belts are used on such equipment as drawer sanders, stroke sanders and centerless grinders. It is observed that the belts normally fail due to a tearing away of the joint during use. Further, such conventionally joined belts are usually not "bump-free" and consequently are not smooth running.

Accordingly it is an object of this invention to provide a method for splicing the ends of abrasive material together to form a high strength, smooth running joint.

Another object is to form an improved abrasive coated belt having a substantially increased useful life under conditions of prolonged use and severe flexing and stretching.

Other objects and advantages of this invention will be apparent from a consideration of the following description of the embodiments described hereinafter in connection with the appended claims.

Referring to the drawings:

FIGURE 1 is a perspective view of an abrasive belt made according to this invention;

FIGURE 2 is an enlarged plan view of a section of an abrasive belt showing an incomplete joint;

FIGURE 3 is a section view of the abrasive belt of FIG-URE 1 taken through line II—II showing a completed joint; 2

FIGURE 4 is a similar view showing a sectional view of another embodiment of this invention.

Referring particularly to FIGURES 2, 3 and 4 the abrasive coated web used in this invention comprises a backing material 1 and a layer of abrasive material 2 adhesively secured thereto. The backing material may consist of any conventional backing used in abrasive coated products, for example; paper, cloth, in various forms such as drill, jeans, heavy twill and other cloth backings; vulcanized fiber; and leather and the backing may be pretreated as, for example, water-proofed.

Abrasive coating 2 comprising abrasive grain and adhesive is applied on one face of the backing by conventional methods well-known in the art. The abrasive in coating 2 may comprise such abrasive materials as flint, cork, vermiculite, quartz, garnet, silicon carbide, diamond and alumina. The abrasive material may be of any grit size useful for abrasive coated belts. The abrasive securing the abrasive material 2 on the backing material 1 may be glue, resin or varnish, the choice of which depends on the desired flexibility and stretch, resistance to heat and other factors which are determined by the intended use of the finished article and production requirements.

In forming abrasive belts according to this invention complementary ends of the abrasive coated strip material of desired width are cut at an angle to the longitudinal axis of the strip. As is common practice in the art, the strip ends are usually cut at an angle of 45° so that the finished joint is formed at a 45° angle. However, very narrow strips may be cut at a smaller angle (30° is not uncommon) and very wide strips may be cut at larger angles if desired. Generally speaking strip ends cut at angles approaching 90° to the longitudinal axis of the strip are undesirable because abrasive belts formed from these strips perform in an unsatisfactory manner on most modern belt sanders and grinders.

The complementary ends of the abrasive coated strip material are skived to remove the abrasive coating at and adjacent the belt ends to be joined. The skived area runs parallel to the cut end of the strip material and may be of any desired width. The skived area is shown in FIG-URE 2 as that area between belt ends 9 and the abrasive coat edge 10a and 10b.

The skived complementary ends of the strip are butted together thereby forming an abrasive belt having a non-abrasive recessed area 7 in the working face. A patch 4 of substantially the same size and shape as recessed area 7 is adhesively inlaid within recessed area 7 on skived portions 3 and joins the strip ends together. Patch 4 may be of any suitable material such as paper, fabric, wire screen, leather or sheeted plastic and is of such thickness that when positioned in the belt the patch surface is below the working surface of the belt. The patch is preferably secured within the recessed area by a flexible, heat-resistant adhesive.

FIGURE 3 illustrates an embodiment of this invention wherein the patch has a coating of abrasive on the outer surface thereof. Although not required by this invention it is preferred that the abrasive grain of coating 15 be of smaller grit size than the abrasive used on the belt in order to avoid a raised portion in the abrasive surface of the belt in the area of the joint. Such a raised portion is to be avoided since it causes chatter-marks on the workpiece due to uneven grinding.

FIGURE 4 illustrates an embodiment of this invention wherein patch 4 is uncoated with abrasive material.

Although the belt ends 9 are shown as being straight, it is within the scope of this invention that they be scalloped, notched or otherwise formed in order to aid in forming a stronger joint between the belt ends.

The method of this invention produces a smooth, flex-

3

ible joint and has proved successful even in applications where the belt contact wheels are of small diameter. The abrasive belts formed according to this invention are smooth running and free of bumps which can cause chatter-marks on the workpiece.

Joints made according to this invention have the further advantage of possessing substantially longer life and greater resistance to wear during use than do joints formed in conventional configuration. This is due to the fact that the patch is inlaid in the grain side rather than the nonabrasive or print side of the belt. Consequently, the patch is not subject to being torn out of the recess by sanding machine contact wheels during use when the print side of the abrasive belt is contacting and traveling over the contact wheels at relatively high speeds. It has been observed that a great many abrasive belts joined by conventional splices having the patch on the print side break because the patch is torn away from the splice by the machine contact wheels and the joint fails.

The following examples illustrate more specifically the manner in which the joint of the present invention may be formed, although the invention is not to be construed as being limited to the particular article set forth in the example.

Example 1

Flexible coated abrasive cloth material produced by conventional means in a conventional manner such as shown in any of U.S. Patents 2,199,752, 2,219,853 or 2,445,807 was formed into abrasive belts in the following manner.

The coated web comprising a drills backing and alumina abrasive coating adhesively secured on the backing with phenolic resin was slit to desired width and cut to length. The ends of the strip were cut at an angle of 45° and skived ½ of an inch on each end to remove the 35 abrasive coating therefrom.

The cut and skived strip ends were butted together thereby providing a non-abrasive recessed area of rhomboidal configuration approximately 1/4" wide in the abrasive face of the belt thus formed.

A patch consisting of a ½" wide strip of substantially the same size and shape as the recessed area in the belt face was cut from an 0.003 inch thick sheet of a polyethylene terephthalate polyester identified as Mylar® 300A. The surfaces of the patch were treated by means 45 such as roughing for improved bonding characteristics.

The patch was adhesively secured in the recessed area by coating the recessed area with an adhesive consisting of 100 parts of a mixture of 20 percent of a diisocyanate resin and 80 percent methylene chloride and 20 parts of an extender consisting of 20 percent rosaniline triisocyanate and 80 percent of a blend of ethyl acetate and acetone, and the patch was pressed therein at a pressure of approximately 20 pounds gauge. Pressure was applied by means of upper and lower platens, the upper platen being approximately the same size and shape as the patch so that pressure is applied only on the patch area. To improve the adhesive bond securing the patch in the recessed area it is preferred to heat the lower platen to a temperature of about 200° F.

An abrasive coating of alumina grain two sizes finer than the alumina grain of the belt and phenolic resin was placed over the patch, care being taken to insure that the thickness of the finished joint was not greater than the thickness of the belt.

While the foregoing example is limited to a joint where the patch is formed from a synthetic material it should be pointed out that the patch may be of cloth, wire mesh, combinations of synthetic materials and natural materials and other materials used for splicing abrasive coated materials. While a diisocyanate resin was used to secure the patch in the example, any adhesive possessing flexi-

bility and resistance to high temperatures may be used. Although the ends of the strip of Example 1 are skived to a width of about 1/8" it should be clear that the strip ends can be skived to any desired width depending on production equipment available and the type of adhesive and patch material used to form the joint.

The following example illustrates another embodiment of this invention wherein the joint is uncoated with abrasive material.

Example 2

The abrasive coated strip material of example was cut to length, skived, and the ends thereof butted together, as in Example 1. A patch of substantially the same size and shape as the recessed area in the belt face formed by the butted skived strip ends was cut from drills fabric and adhesively secured in the recessed area to form the joint using extra grade animal glue to secure the patch. No abrasive coating was placed over this patch.

It should be pointed out that in this embodiment of the invention the thickness of the patch should be such that when adhesively inlaid in the recessed area of the belt face the upper surface of the patch is not above the abrasive surface of the belt.

While the invention has been described in connection with specific embodiments thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention. It will, therefore, be recognized that the invention is not to be considered as limited to the precise embodiments shown and described but is to be interpreted as broadly as permitted by the appended claims.

I claim:

- 1. A method of making an abrasive belt comprising the steps of forming complementary ends on a strip of an abrasive coated web by cutting said ends, removing said abrasive coating at and adjacent to each of said ends, butting said ends together to form a non-abrasive, recessed area in the abrasive face of said belt, forming a patch of substantially the same size and shape as said recessed area, and adhesively securing said patch in said recessed area thereby joining said butted ends together, the outer surface of said patch being provided with an adhesively held coating of abrasive grain on its outer face.
- 2. The method as defined in claim 1 wherein the grain size of said abrasive coating is finer than the abrasive of said abrasive coated web.
- 3. An abrasive belt comprising a strip of an abrasive coated sheet material having complementary ends and being free of abrasive material adjacent said ends, said ends being in abutting juxtaposed relationship thereby forming a recessed, non-abrasive area on said abrasive coated sheet material and a patch of flexible, high strength material of substantially the same size and shape as said recessed area adhesively positioned therein to maintain said complementary ends in abutting, juxtaposed relationship, said patch is provided with an adhesively held coating of abrasive grain, said abrasive grain having a smaller particle size than that of the abrasive of said abrasive coated sheet.

References Cited

UNITED STATES PATENTS

3,154,897 2,733,181 1,728,673	11/1964 1/1956 9/1929	Summers et al Howard Riedesel 51 Driver	51—399 —399 X 51—399
2,784,536	3/1957	Barron	51-399

JAMES L. JONES, Jr., Primary Examiner.

4